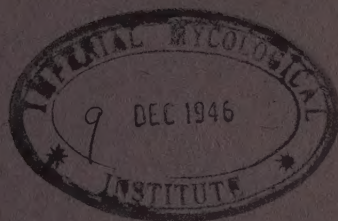


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DISEASES CAUSED BY BACTERIA AND FUNGI

OURILSKY, R., & MERCIER, P. (1942.) Sur les méthodes de différenciation entre les staphylocoques pathogènes et non pathogènes. [Differentiation of pathogenic and non-pathogenic staphylococci.]—*Rev. Immunol.* 7. 53-73. 1927

The pathogenicity of various strains of *Staphylococcus* was assessed by the subcutaneous inoculation of graduated doses in the rabbit, the lowest dilution producing a given skin reaction being taken to express the degree of pathogenicity of the strain tested. The value of various characters of staphylococci was compared with this pathogenicity with the following results.

(1) Although there was no constant relation between pigmentation and pathogenicity the majority of virulent strains were golden. (2) *In vitro* haemolysis was almost invariably a character of pathogenic strains. (3) The most constant feature of pathogenic strains was the fermentation of mannitol and a positive agglutase reaction. (4) Crystal violet produced purple colours in virulent but not in non-pathogenic strains. (5) Antiserum produced from pathogenic strains appears to agglutinate these specifically; similarly, non-pathogenic strains produce agglutinins specific for themselves. One strain which was originally non-pathogenic, was made to become virulent and in so doing developed the characters related to pathogenic strains.—B. WEITZ.

EVANS, A. C. (1946.) Types of streptococci associated with bovine mastitis followed by outbreaks of human disease.—*J. infect. Dis.* 78. 18-24. 1928

E. reviews the work carried out on 29 outbreaks of human streptococcal disease following milk-borne infection. Outbreaks could nearly always be traced back to a cow and milker infected with one of the strains of streptococci responsible for mastitis in the cow, i.e., Griffith's strain 13 (*Str. epidemicus*), strain 27 (*Str. epidemicus* II, Davis *et al.*) and its closely related strains 1 and 3, 11 and 12. Infections were nearly always classified as septic sore throat, although in many cases they were diagnosed as scarlet fever particularly in strain 3 outbreaks. It is significant that when outbreaks of septic sore throat occur which are due to one of the above strains, they can nearly always be traced back to bovine infection, whereas scarlatinal strains are only infrequently traced back to this source.—R. M. L.

MOREIRA-JACOB, M. (1944.) A mamite aguda dos bovinos em Portugal. [Acute bovine mastitis in Portugal.]—*Rev. Med. vet., Lisboa.* 39. 238-242. 1929

IL VALENTE, J. S. (1944.) A mastite aguda dos bovinos em Portugal. [Acute bovine mastitis in Portugal.]—*Ibid.* 39. 463-468. 1930

II. MOREIRA-JACOB, M. (1945.) A propósito de uma crítica. (A mamite aguda em Portugal.) [Reply to criticisms of I.]—*Ibid.* 40. 61-77. 1931

I. The author gives a brief review of acute bovine mastitis. Of 26 samples of milk received, *Corynebacterium pyogenes* was isolated in eight, *Bacterium coli* in eight, *Staphylococcus aureus* in two, *Staph. albus haemolyticus* in one, beta-haemolytic bacilli in two and a non-pathogenic bacillus in one. From two other cases *Proteus vulgaris* and *Pasteurella* were isolated. Two examinations proved negative.

II. Work reported in I is strongly criticized on the ground that possible contamination of samples during transport has not been given adequate consideration.

III. The author's reply to the criticism recorded in II.—H. G. ARAMBURU.

MUNCH-PETERSEN, E. (1945.) Studies on bovine mastitis. II. A note on the presence of streptococci, especially *Str. agalactiae*, in milk from beef cows.—*Aust. vet. J.* 21. 12-14. [For part I, see V. B. 12. 1.] 1932

In an examination of 895 milk samples from 58 beef cows taken during the first three and a half months after calving, streptococci were found in 79 samples. 64 quarters of 37 cows were infected. Ten of the samples contained *Str. agalactiae*. All quarters were clinically normal.—D. C. BLOOD.

WOODRUFF, C. E., KELLY, R. G., & LEAMING, M. A. (1945.) Spleen-appearance time of tubercle bacilli as related to dosage of bacilli.—*Amer. Rev. Tuberc.* 51. 574-581. [Spanish summary.] 1933

With the particular strain of tubercle bacillus used (the human type, Cary strain) and with the particular technique of subcutaneous inoculation employed, it was found that in g. pigs the spleen was invaded very quickly after a large dose but not for many days after a small one. For example, it was invaded within one day after a dose of 1 mg. but not until after 12 days when a dose of 10^{-6} mg. was given. Acute inflammation at the injection site and invasion of the spleen preceded the development of allergy.—J. E.

BIRKHAUG, K., & SCHJELDERUP, H. (1943.) Hematology in experimental tuberculosis. The hemogram in anaphylactic-allergic and anaphylactic-atherergic tuberculous guinea pigs.—*Acta med. scand.* 113. 527-557. [In English.] 1934

Three groups of g. pigs were used in this investigation, (1) iatrogenic immune to TB., (2) allergic immune, and (3) allergic controls. Basic levels for the blood constituents were established by making 180 observations and following this all the animals were injected intraperitoneally with approximately 37,000 viable virulent human tubercle bacilli. Further haematological observations were made on the 11th, 17th, 24th, 33rd, 38th, 45th, 52nd and 58th days after inoculation with the virulent organisms.

The chief haematological findings were as follows. There was no change in the haemoglobin percentage, in the period following inoculation as compared with the preinoculation period, in group 1, but there was a slight fall in group 2 beginning on the 48th day after inoculation and a rapid fall in group 3 beginning 33 days after inoculation. The number of erythrocytes showed a rise in group 1 beginning 48 days after inoculation, but in groups 2 and 3 there were falls in erythrocyte numbers corresponding to the fall in haemoglobin percentage in these two groups. In groups 1 and 2 an initial leucocytosis was followed by a fall to almost normal level in the post-inoculation period, whilst in group 3 there was a significant upward deviation in the number of leucocytes. In all three groups there was no change in the numbers of young metamyelocytes and in group 1 there was no change in the number of stab cells (band forms of metamyelocytes), but in groups 2 and 3 these cells increased to significant numbers. There was no significant change in the numbers of segmented cells in groups 1 and 2, but in group 3 increases were seen on the 52nd and 58th days after inoculation; these changes were not, however, of a high order. There was practically no change in the percentage of neutrophils in the post-inoculation period in group 1, but in groups 2 and 3 there was a tendency for this to rise during the whole of the post-inoculation period, the rise being greater in group 2 than in group 3. Basophiles showed no change in any of the groups and eosinophiles likewise showed little change, but a tendency to a slight fall was seen in groups 2 and 3. In group 1, lymphocyte percentages showed no change, but in groups 2 and 3 a fall was observed beginning on the 24th and 33rd days respectively. There was no change in monocyte percentage throughout the post-inoculation period in group 1 but in group 2 there was a rise beginning on the 24th day and in group 3 there was a continued rise.

From the figures obtained, the Crawford-Medlar leucocytic index, the monocyte-lymphocyte ratio and the neutrophile-lymphocyte ratio were calculated and compared as indicators of the advance of TB. infections. In group 1 there was no significant change in the leucocytic index during the whole post-inoculation period, while in group 2 there was a significant rise at the 24th day and in group 3 the values were elevated during the whole period. In group 1 the monocyte-lymphocyte ratio showed no significant sustained rise. There were peaks on the 45th and 58th days but on only the latter occasion was the rise significant. In group 2 there was an evenly sustained rise in the monocyte-lymphocyte ratio beginning on the 24th day and a similar effect was seen in group 3 but beginning on the 17th day. In group 1 there was no significant deviation in the neutrophile-lymphocyte ratio except one on the 11th day after inoculation; this was in a descending direction. In group 2 there was a steady rise in the neutrophile-lymphocyte ratio beginning on the 24th day and in group 3 it rose to a higher end level than in group 2.

After discussing these observations the authors conclude that the Crawford-Medlar leucocytic ratio records most accurately the trend of advancing tuberculous infection and that the monocyte-lymphocyte ratio and the monocyte percentage are the second most reliable indices for this purpose. The microcytic type of iron deficiency anaemia seen in all groups is considered to be due probably to the toxic effects of the products of the tubercle bacillus, but this is a less sensitive indication of advancing infection than the monocyte-lymphocyte ratio and monocyte percentage. Increase in circulating monocytes occurs some time before the decline in lymphocytes occurs. Advancing

lymphopenia is proportional to loss of resistance and is therefore a better prognostic aid than increase in the percentage of monocytes. When the disease is fully established an increase occurs in neutrophils and immature band forms of metamyelocytes. In the highly resistant iatrogenic-immune animal, few deviations in numbers of blood cells and cell ratios were observed during test infection, whilst allergic-immune and allergic control animals showed excessive changes, the pattern of the changes being essentially the same in both cases.—T. E. GIBSON.

CORPER, H. J., & COHN, M. L. (1944). The biologic diagnosis of tuberculosis: quantitative animal evaluation tests on the Syrian hamster and the guinea pig.—*Amer. J. clin. Path.* 14. 571-576. 1935

The relative susceptibility of 36 hamsters and 36 g. pigs was determined by inoculating them in groups of three, using measured doses of tubercle bacilli from three human and two bovine strains. All five strains proved more virulent for g. pigs, all of which developed lesions with doses of "0.000,001 mg. in fine suspension", a dose which failed to infect most of the hamsters. The authors point out that none of the earlier literature, which gives the impression that hamsters are as susceptible as g. pigs, describes quantitative methods used with such small doses.

The authors consider that although g. pigs are markedly superior to hamsters for routine diagnostic work, properly performed cultural methods are better still. Where facilities for culture are available g. pigs should be used to assess the virulence of the strains isolated.—C. M. FORD.

STEMMERMANN, M. G., & STERN, A. (1946). Tubercle bacilli in the metabolic apparatus.—*Amer. Rev. Tuberc.* 53. 264-266. [Spanish summary.] [Authors' conclusions copied verbatim.] 1936

In order to determine whether or not the basal metabolism machine may act as a mechanical vector in the dissemination of pulmonary tuberculosis, this instrument was tested for the presence of tubercle bacilli. After each of 14 patients with massively positive sputum had breathed and coughed into the machine for ten minutes, the remaining gases were flushed out with air and the connecting rubber hoses were irrigated with saline. In not a single instance could tubercle bacilli be recovered from the washings, indicating that even after its continued use by highly "positive" patients the basal metabolism machine is not a likely factor in the spread of pulmonary tuberculosis.

EMMART, E. W. (1946). The tuberculostatic action of the sodium salts of certain synthetic allylic acids.—*Amer. Rev. Tuberc.* 53. 83-95. [Spanish summary.] [Author's conclusions copied verbatim.] 1937

It has been shown that certain cyclopentyl compounds chemically related to chaulmoogric acid and certain cyclohexyl allylic acids produced marked inhibition in growth of tubercle bacilli of the A27 strain in both Kirchner's medium and Difco beef bouillon. Four of these compounds, sodium-3-allylcyclopentane carboxylate, sodium-3-cyclopentylacetate, sodium-3-cyclopentyl-cyclopentylacetate and sodium-4-cyclohexylcyclohexane carboxylate, were found to be highly tuberculostatic. Under the same experimental conditions the sodium salt of chaulmoogric acid was considerably less effective.

Judged by the incidence and extent of tubercle formation on infected chorioallantoic membranes of the chick embryo, the virulence of suspensions of bacilli exposed to the action of 0.5 mg. of these drugs in 0.2 c.c. of suspension for twenty-four hours was greatly attenuated as compared with that of control suspensions

in physiological saline. The marked activity of these four compounds in relatively low doses suggests that further studies in other experimental animals would be profitable.

BELLER, K. (1942.) Ist die Ziegentuberkulose eine Gefahr für den Menschen? [Tuberculosis in goats a danger to human beings.]—*Hippokrates, Stuttgart*. pp. 670-672. [Abst. from abst. in *Jber. Vet.-Med.* 71. 118.] 1938

B. summarizes his observations on TB. in goats [*V. B.* 12. 402 & 567], referring to the keeping of two and a half million milk goats in Germany and the annual production of 1,500 million kg. of milk, of which one-quarter is consumed by human beings.

Out of 103 goats kept in contact with cows, 22 were found to be tuberculous; three out of 161 goats kept alone were tuberculous. Of 40 strains of tubercle bacilli isolated from goats, all but one which was of the avian type, were of bovine type. For diagnosis of TB. in goats, B. recommends the complement-fixation test.

—J. E.

MUDALIAR, S. V. (1944.) An advanced case of Johne's disease in a Bellary ewe at the livestock research station, Hosur.—*Indian vet. J.* 21. 98-101. 1939

An adult ewe gave a negative reaction to johnin, about a year before its slaughter. It had lost weight, had submaxillary oedema, particularly after grazing, and passed loose faeces. Faecal smears revealed acid-fast bacilli, resembling *Mycobacterium johnei*. P.M. examination revealed it to be a case of advanced Johne's disease.—G. L. SHARMA.

FIELDING, J. W. (1945.) Rat leprosy: observations and transmission.—*Med. J. Aust.* May 12th. 473-486. 1940

Numerous experiments concerned with rat leprosy are recorded. Net findings include the discovery of rat leprosy in New South Wales, in two specimens of *Mus musculus* and three specimens of *Rattus norvegicus*. In infected animals organisms were found in situations not previously reported, viz. the stomach, pylorus, duodenum, sternum, pericardium, brain and bulbo-urethral and preputial glands. Experimentally rats may be infected from hookworm larvae, but although it is shown that larvae may take up the organism, it is uncertain whether infection is by this route or whether organisms are merely carried through from contaminated soil. Ectoparasites also harbour the organism and infection has resulted from feeding rat lice and from subcutaneous inoculation and inunction of emulsions of ectoparasites.

The virulence of organisms from faeces, urine and primary ulcers is greater than that of organisms from granulomas and long-standing ulcers. Superinfection at regular intervals with the more virulent type of organisms breaks down resistance, but injection of the less virulent types at irregular intervals may build up an immunity which will eventually destroy all signs of local infection.

Subcutaneous injection of organisms always produces a local lesion but this may be absorbed. Clinical lesions of a permanent nature may be produced by repeated inunction of virulent organisms.

Vitamin B₂ deficiency was found to have no demonstrable influence on experimental infection.

—N. WICKHAM.

LOVELL, R. (1944.) Further studies on the toxin of *Corynebacterium pyogenes*.—*J. Path. Bact.* 56. 525-529. 1941

The production of toxin from the growth of *Corynebact. pyogenes* in milk is described. Skin reactions can be produced in g. pigs or rabbits by the intradermal inoculation of dried or fluid toxin. Experiments show

that titration of toxin by the *in vitro* method corresponds to results obtained by biological tests. Attempts made to separate the haemolytic from the lethal factor in the toxin have failed. L. suggests, however, that owing to divergencies in the ratio of the minimum haemolytic dose to the M.L.D. occurring with dried toxin as compared with fluid toxin, there is still a possibility that the haemolytic activity of the toxin is different from its lethal power in mice and ability to produce skin reaction in g. pigs.—B. WEITZ.

PALMER, C. C., KAKAVAS, J. C., & BIDDLE, E. S. (1945.) Bovine mastitis caused by a *Corynebacterium* not previously described.—*N. Amer. Vet.* 26. 401-404. 1942

An outbreak of mastitis in 20 cows among a herd of 60 is described. The condition was characterized by swelling of the quarter, sometimes with marked oedema, and subsequent partial induration. Pure cultures of an unidentified corynebacterium, somewhat resembling *Corynebact. bovis*, were recovered from affected quarters. The authors claim this condition to be a new type of mastitis. Forms of treatment with sulphanilamide in oil by intramammary injection and with vaccine are described. It was found that drying off the cow was more successful, as the animal would return to milk normally in the subsequent lactation. However, no untreated controls were kept.—B. WEITZ.

ROACH, R. W. (1946.) The survival of *Corynebacterium pyogenes* in discharges from the udder and the uterus of the cow.—*Vet. Rec.* 58. 169-171. 1943

R. describes *in vitro* experiments to determine the value of acriflavine, iodine, metholyl and dettol as disinfectants or antiseptics against *Corynebact. pyogenes* in discharges or infected milk. R. found that 1:1,000 aqueous iodine was effective against the organisms in uterine discharge after 2 min., in thick "summer mastitis" milk after $\frac{1}{2}$ min., and in thin milk after 1 min. The resistance of the organism to heat is also discussed.

—B. WEITZ.

VALLÉE, M. (1945.) Sur la vaccination active contre le rouge. [Vaccination against *Erysipelothrix rhusiopathiae* infection.]—*Rev. Path. comp.* 45. 417-419. 1944

Strains of *E. rhusiopathiae* were attenuated by growth in a medium containing "gonacrine" (tryptamine and chlorhydrate of 3-6 di-amino acridine). Growth will take place initially in a concentration of 1:300,000, after seven passages in a concentration of 1:100,000, and after 17 passages in a concentration of 1:50,000, at which concentration a homogenous broth culture is obtained after three days' incubation. After ten passages at this concentration of gonacrine, an intramuscular injection of 3 ml. into a pigeon has no effect. The medium used for growth is a synthetic medium, the composition of which is not given.

The intramuscular injection into pigeons of 0.5 ml. of the attenuated culture in broth, gave them resistance to 10 M.L.D. of virulent organisms, the controls dying in 45-50 hours.

Owing to their varying response to vaccination, and the difficulty of setting up the disease in pigs, these animals have not yet been used for experiment.

—R. M. LOOMORE.

SCHNEIDER, L., & SZAKMÁRY, G. (1944.) Neuere Aetiologie des bösartigen, ansteckenden Schnupfens der Kaninchen und dessen Behandlung. [Aetiology of malignant contagious rhinitis of rabbits and its treatment.]—*Berl. Münch. tierärztl. Wschr./Wien. tierärztl. Mschr.* August 18th. 265-269. 1945

The authors describe a form of contagious rhinitis

of rabbits with certain features that distinguish it from the infection usually attributed to an organism of the *Pasteurella* group. The disease is sub-acute and often chronic, in distinction to the acute syndrome of pasteurellosis. The causal organism was found to be a small ovoid non-motile Gram-negative bacillus most easily isolated from the purulent nasal discharge. It was differentiated serologically and biochemically from the *Pasteurella* group. Indole production was weak or negative; arabinose was not fermented, but xylose and sorbitol were. About 400 strains have been isolated from 54 infected rabbits and in view of their resemblance to organisms of the *Pasteurella* group the authors suggest the generic name *Parapasteurella*. No specific treatment is advocated but autogenous ana-culture vaccine was of some help in preventing complications and in shortening the course of the disease. The vaccine was also capable of inducing in healthy rabbits immunity lasting about four months.—W. M. H.

GABY, W. L. (1946.) A study of the dissociative behavior of *Pseudomonas aeruginosa*.—*J. Bact.* 51. 217-234. [Author's summary copied verbatim.] 1946

The results of a study of the dissociation of *Pseudomonas aeruginosa* have been reported. By appropriate means it was possible to demonstrate that colonies derived from cultures of *Pseudomonas aeruginosa* isolated from human infections vary considerably in their morphological appearance. These colony variations were numerous and were shown to be derived from at least three basic colony types designated herein as types A, B, and R.

The patterns of fermentative and proteolytic activities of these colony types were extremely variable and apparently would be of little value as a means of classification.

Agglutination reactions of the various cultures of *P. aeruginosa* indicated that the somatic antigens are homologous, but agglutinin-absorption tests show a definite heterologous relationship existing between the flagellar antigens of the three basic colony types.

The types of *P. aeruginosa* responsible for the production of the "Pyo" compounds and pyocyanin have been identified and described.

FASTIER, L. B. (1945.) A bacteriophage for *Pseudomonas pyocyanea* (*Pseudomonas aeruginosa*).—*J. Bact.* 50. 301-303. [Author's summary copied verbatim.] 1947

The isolation of a bacteriophage specific for *Pseudomonas pyocyanea* (*Pseudomonas aeruginosa*) is reported. By means of this phage a stock culture of *P. pyocyanea* has been shown to be composed of resistant and nonresistant strains, which up to the time of writing have shown no variation in their reaction to phage treatment. No difference in pyocyanase production by the two strains could be detected.

ALTUE-WERBER, E., LIPSCHITZ, R., KASHDAN, F., & ROSENBLATT, P. (1945.) The effect of incompletely inhibitory concentrations of penicillin on *Escherichia coli*.—*J. Bact.* 50. 291-295. [Authors' conclusions copied verbatim.] 1948

Zygosporerlike bodies appearing in the urine of patients treated with penicillin have been described. These are morphologic variants of *Escherichia coli* which revert to type on culture.

These forms have been reproduced *in vitro*.

CHERRY, W. B., BARNES, L. A., & EDWARDS, P. R. (1946.) Observations on strains of a monophasic salmonella variant. —*J. Bact.* 51. 235-243. [Authors' summary copied verbatim.] 1949

Attention is called to a recently observed increase in the prevalence and distribution of a monophasic

Salmonella type with the antigenic formula IV, V, XII : e, h-. The organisms have been recovered from swine, fowls, and in man from asymptomatic carriers, sporadic cases, and epidemics of gastroenteritis. The strains appear to be endemic in California and Hawaii. It is suggested that the designation *S. reading* for this organism should be subjected to further scrutiny until more direct evidence of its probable diphasic ancestry is acquired.

Certain of the clinical and epidemiological characteristics of infections due to this group of organisms were described. Extensive biochemic and serologic experiments cited were designed to detect, if possible, some clue as to the derivation of the monophasic variants. Serologic results were not fruitful, but the suggestion is made that the strains may have developed as a result of a biochemic variation correlated with an antigenic alteration. Some possible further lines of approach are mentioned.

ATKINSON, N., WOODROOFE, G. M., & MACBETH, A. M. (1944.) The occurrence of salmonella types in Australia. 2.—*Aust. J. exp. Biol. med. Sci.* 22. 201-204. [Authors' summary copied verbatim.] [For part 1, see *V. B.* 15. 318.] 1950

Forty-one strains of *Salmonellas* isolated in Australia have been typed serologically.

S. typhi-murium occurred most frequently and few IV-variants were found. A new serological type, for which the name *S. kensington* is suggested, was discovered. The remaining strains were identified as *S. adelaide*, *S. blegdam*, *S. newbrunswick*, *S. newport*, *S. bovis-moribificans* or *S. cholerae-suis* var. *kunzendorf*. Most of these *Salmonellas* came from faeces of human cases of gastro-enteritis or enteric-like fever.

JANSEN, J. (1943.) Pullorumonderzoek in de praktijk. [Pullorum disease.]—*Tijdschr. Diergeneesk.* 70. 71-79. [Abst. from abst. in *Dtsch. Tierärztl. Wschr./Tierärztl. Rdsch.* 51/49. 218.] 1951

Pullorum disease is widespread in Holland. The rapid whole blood agglutination test is the routine diagnostic method but the tube test is used in doubtful cases.—J. ZWEIF.

MONTEVERDE, J. J., & SIMEONE, D. H. (1944.) Salmonellas distantes de *S. pullorum* y *S. gallinarum* en aves "reaccionantes". [*Salmonella pullorum* and *Salmonella gallinarum* in "reacting hens".]—*Rev. Fac. Agron. Vet., B. Aires.* 11. 31-41. [English and Portuguese summaries.] 1952

The authors isolated the following salmonellas from hens which reacted to the *S. pullorum* agglutination test: *S. newport* (2), *S. brandenburg* (2), *S. goettingen* (3), *S. thompson* (2), *S. typhi-murium* (1), *S. poona* (2), *S. meleagridis* (1) and *S. onderstepoort* (1).—A. BUXTON.

CHASE, F. E., & WRIGHT, M. L. (1946.) The occurrence and distribution of *Salmonella* types in fowl. I. Isolation from hens' eggs.—*Canad. J. Res. Sect. F.* 24. 77-80. 1953

An examination was made of 1,000 eggs laid by a flock of 55 known pullorum reactors. *S. pullorum* was recovered from 6.1%. Cultures of the exterior of 400 eggs from this group failed to show the presence of the organism. The contents of 1,000 eggs from a negative flock were also examined and yielded no *Salmonella* types. From these results and those of other workers the authors conclude that hens' eggs are not likely to be infected with *Salmonella* types other than *S. pullorum*.

—R. GWATKIN.

HUDDLESON, I. F., WOOD, E. E., CRESSMAN, A. R., & BENNETT, G. R. (1945.) The bactericidal action of

bovine blood for *Brucella* and its possible significance. —*J. Bact.* 50, 261-277. [Authors' summary copied verbatim.] 1954

It is pointed out that several factors influenced the results of an *in vitro* test for measuring the bactericidal action of bovine blood for *Brucella*.

Blood plasma from normal calves and cows possesses a complex which kills large numbers of *Brucella abortus in vitro*. Serum possesses the same property, but to a lesser extent.

The bactericidal complex does not make its appearance in calf blood to any extent until after the ingestion of colostrum.

Blood plasma from cows infected with *Brucella abortus* possesses a property which inhibits the killing action of the bactericidal complex for *Brucella*.

Brucella-infected cows may be detected and distinguished from those not infected by making use of differences shown in the bactericidal action of their plasma for *Brucella*.

The serial dilution method reveals greater differences in the bacterial-growth-inhibiting action of plasma from normal and *Brucella*-immune cows. Such differences suggest that specific bactericidal antibodies, if present in sufficient concentration, play an important role in the protection of cattle against brucellosis.

I. DE ROPP, R. S. (1945.) Comparison of the immunising value in guinea-pigs of living avirulent *Brucella abortus* vaccines, strains 45(20) and S.19.—*J. comp. Path.* 55, 70-84. 1955

II. EDWARDS, S. J., DE ROPP, R. S., & McLEOD, D. H. (1945.) A study of the immunological properties and infectivity of *Brucella abortus* strain 45(20), McEwen, in cattle.—*Vet. Rec.* 57, 259-264. Discussion pp. 264-265. 1956

III. McEWEN, A. D. (1946.) Further experiments on the infectivity of vaccine prepared from *Brucella Abortus* strain 45(20) for cattle.—*Ibid.* 58, 3-6. 1957

IV. McEWEN, A. D. (1946.) Contagious abortion vaccine prepared from strain 45(20). Field vaccination trials.—*Ibid.* 57-64. 1958

I. Both strain 45(20) (McEwen) and strain 19 are strains of reduced virulence, lacking the capacity to multiply or produce lesions in the g. pig. In these experiments their behaviour is studied and compared with a fully virulent strain, 544 (McEwen). The effect of the fully virulent strain in g. pigs which had been vaccinated with one or the other of the avirulent strains was also studied.

Both the avirulent strains were found incapable of multiplying to any extent in the spleen or of producing enlargement or lesions in this organ. After inoculation of 3×10^6 viable organisms strain 45(20) persisted in the spleen up to 12 weeks, whilst strain 19 was eliminated in less than six. The virulent strain persisted in the spleen for more than 15 weeks and produced lesions and enlargement. Agglutinins of high titre appeared in the blood serum and persisted after the organisms had been eliminated.

In the vaccine experiments, strain 19 conferred a better immunity than 45(20). Vaccine prepared from strain 19 produced immunity more rapidly than did vaccine prepared from strain 45(20). A single dose of strain 19 vaccine inoculated into g. pigs at three and four weeks old conferred an immunity that persisted until the animals reached maturity. Immunity was found to be incomplete even against a test dose of only 300 viable organisms of the virulent strain and in such cases 20-30% of the g. pigs were found to be infected, though this was a lower percentage than in the controls. A positive correlation was shown between

the spleen count and the spleen weight (expressed as a percentage of the body weight) and the agglutination titre of vaccinated and unvaccinated g. pigs killed nine weeks after exposure to infection with strain 544. Aggl. titres were a less reliable index of infection than the spleen weights.

II. The authors describe experiments performed to study the value of strain 45(20) (McEwen) in protecting susceptible pregnant heifers against virulent infection. A study was also made as to the possible excretion of strain 45(20) in the milk of vaccinated animals by injecting recently calved cows with this strain and examining the milk at weekly intervals. Two months after vaccination these cows were served and at parturition a further search for *Br. abortus* was made. An experiment was also carried out to ascertain if strain 45(20) persisted in the tissues of vaccinated animals.

In the experiment to ascertain the protection afforded by vaccinating bovines with strain 45(20), ten heifers were vaccinated and later infected with 150 million virulent *brucella* (strain 544) at the 5th-6th month of pregnancy and ten heifers were similarly vaccinated and infected with one million organisms. In each group ten controls were maintained. The vaccine consisted of 8 ml. of a suspension of strain 45(20) with a viable count of 15,000 million organisms per ml. Two doses of 8 ml. were inoculated at about five weeks' interval and services were commenced five weeks after the last inoculation. In the vaccinated group infected with 150 million organisms, one aborted and one produced a premature living calf while the remainder produced full-term calves. The infecting strain was recovered from the colostrum and foetal membranes of six of the animals. In the nine remaining control heifers all became infected and with the exception of two which had premature living calves, all aborted dead calves. In the vaccinated group infected with one million organisms, one aborted from a non-specific cause and one developed a light infection of the foetal membranes. In the equivalent control group of nine heifers six became infected. Three gave birth to premature living calves and the remainder to full-term calves.

Of nine lactating cows which were vaccinated with strain 45(20) before service, *Br. abortus* was isolated at subsequent parturition from the foetal membranes or colostrum or from both in the case of five animals. It was also recovered in two other cases in post-calving milk samples. The virulence of the strains recovered from these infected cows was found to have become exalted so that it was equal to that of a fully virulent strain. Of 11 non-pregnant cattle killed at intervals after infection with strain 45(20), it was found that the organism persisted in the tissues of four and that it could be recovered after an interval of 80 days.

III. A herd of about 60 cattle presumed to be *brucella*-free was blood-tested and all were found to be negative. Vaccination with strain 45(20) was practised for nearly two years. The foetal membranes and colostrum were examined and no infection was found. One animal, however, was found to be infected at one subsequent milk test. The strain isolated was aerobic but similar to field strains in virulence. It appears from the evidence that this animal was possibly infected at the time of purchase about two years previously. The aggl. titre rose to a partial reaction at 1:80, and was 1:10 at the time of calving a few months later when the foetal membranes and colostrum proved negative.

It is known that pregnant animals vaccinated more than three months after service with strain 45(20) may abort, and an experiment was carried out on seven

negative heifers from a herd free from abortion to test the results of vaccinating at varying intervals up to two and a half months after service by examining the membranes and colostrum at parturition. All calved normally and only one animal, vaccinated two months after service was positive, *Br. abortus* being isolated from the foetal membranes and colostrum. The aggl. titre did not rise above 1:20. The organisms were not numerous and were identical in character with strain 45(20). Atypical bacteria were seen in the foetal membranes of another animal but as they could not be recovered, were apparently dead or of low virulence.

In a lengthy discussion, the author criticizes the findings of EDWARDS *et al.* in II and puts forward various reasons for questioning the validity of their conclusions regarding strain 45(20). In his experience strain 45(20) may be inoculated into non-pregnant animals without causing infection; he considers that the evidence refutes the suggestion that this strain commonly mutates and becomes virulent.

IV. The author sums up the results obtained by the vaccination of cattle in over 100 herds with strain 45(20), the preparation of which is described. Vaccination was confined to non-pregnant animals classed as non-reactors or doubtful reactors to the agglutination test and before vaccination each animal was blood-tested and its history recorded. Monthly records of the herd were received, together with details of new additions, etc., and retests were made at six-monthly intervals.

An analysis of the incidence in Britain of reactors and abortions in different pregnancies shows that abortions reach their peak at the second pregnancy and thereafter decline. The infection, as judged by positive reactions to the aggl. test, reaches a peak after the second pregnancy and remains constant for all subsequent pregnancy groups.

The results are assessed in an extensive analysis presented in tabular form. In these tables the animals are grouped into those in their first pregnancy, those in their second pregnancy, and second-calf cows and all cows that have had more than two calves. Animals in large self-contained herds where vaccination and eradication were practised, are shown separately, and a comparative grouping of the results of vaccination of animals from lightly infected and heavily infected herds. The results are explained and discussed in detail. Vaccination with strain 45(20) does not cause the production of agglutinins. The beneficial results of vaccination are most clearly shown in the second and later pregnancies following vaccination. Vaccination may be combined with disposal of reactors and should prove a valuable adjunct to a scheme for the eradication of contagious abortion.—S. J. GILBERT.

TALBOT, R. J. DE C. (1945.) Strain 19 vaccination against contagious abortion. Preliminary report on a field trial in Victoria.—*Aust. vet. j.* 21. 67-68. 1959

A statement is given of the conditions of agreement under which the Department of Agriculture in Victoria is using strain 19 vaccination.

Since 1943, 14,000 cows and calves in 350 herds have been vaccinated; the results are considered promising.—N. WICKHAM.

POPE, C. (1945.) Observations on the use of strain 19 vaccine in the field.—*Aust. vet. j.* 21. 68-69. 1960

These observations were made on three herds in the Ballarat district from September, 1943, to January, 1945.

(1) The majority of adult vaccinated cows retain a high agglutination titre and continue to give a positive agglutination reaction. (2) The majority of unbred

heifers over nine months of age when vaccinated, become negative. (3) Heifers vaccinated at 4-8 months of age reacted but became negative in 2-5 months. (4) Five heifers, apparently in calf when vaccinated, calved normally 3-8 months later. (5) Vaccinated cattle are subject to a local and general reaction.—N. W.

*HINDERSSON, R. [Equine contagious abortion.]—*Suom. Eläinlääkäril.* p. 89. [Abst. from abst. in *Berl. Münch. tierärztl. Wschr.* *Wien. tierärztl. Mschr.* Jan. 7th. 10. (1944).] 1961

The abstract states that this is the first instance in Finland of abortion in a mare found to be due to *Brucella abortus*.—J. ZWEIF.

LAKIN, H. W., QUORTRUP, E. R., & HOTCHKISS, N. (1944.) The relation of selenium to western duck sickness [botulism].—*Auk.* 61. 415-420. [Abst. in *Exp. Sta. Rec.* 92. 117, copied verbatim.] 1962

Following a reconnaissance survey in North Dakota, Montana, South Dakota, Nebraska, Utah, Oregon, and California of areas in which losses from western duck sickness were known to exist, livers and gizzards of both sick and healthy waterfowl were analyzed for selenium, as were also samples of mud from each area and some samples of vegetation. While selenium was generally present in detectable quantities it did not "appear to be a factor in western duck sickness. . . . That the small amounts of selenium in their diet and drinking water should cause the tremendous losses of waterfowl experienced in some of these areas is most unlikely".

TOOP, C. R. (1944.) Mycotic dermatitis ("lumpy wool") and fleece rot of sheep.—*J. Dep. Agric., W. Aust.* 20. 319-322. 1963

Descriptions are given of mycotic dermatitis and fleece rot, the conditions under which they occur, and their relation to blowfly strike.—N. WICKHAM.

CATANEI, A. (1945.) Sur le passage dans le sang des champignons-parasites des teignes. (Etude expérimentale.) [Infection of the blood stream with *Ctenomyces mentagrophytes*.]—*Arch. Inst. Pasteur Alger.* 23. 173-175. 1964

Blood was collected by intracardiac puncture from g. pigs infected experimentally on the skin of the back 7-14 days previously with *Ctenomyces mentagrophytes*. The blood was cultured on Sabouraud's agar. Positive results were obtained in 16 out of 206 g. pigs.

Cultures were also made with blood and organ emulsions from 48 g. pigs which had died or been killed 14-26 days after experimental infection. Two out of 32 blood samples were positive. Three positive results were obtained from spleen cultures and none from liver cultures.—M. C.

WEBSTER, W. (1945.) The field control of contagious pleuro-pneumonia.—*Aust. vet. j.* 21. 64-67. 1965

Pleuro-pneumonia of cattle is not endemic in New South Wales but is usually introduced by cattle brought for fattening from Queensland or the Northern Territory. In large herds, where there is only a small staff, destruction of clinical cases and inoculation with culture virus is carried out. Where possible, clinical cases are slaughtered and complement-fixation tests and vaccinations with culture virus, are made simultaneously on the remainder. In in-contact herds with no clinical cases and in herds where clinically normal carriers are suspected, complement-fixation tests are made until two negative reactions are obtained. Cattle in infected herds must not be kept in close contact longer than is absolutely necessary.—D. C. BLOOD.

KNAYS, G. (1945.) Investigation of the existence and nature of reserve material in the endospore of a strain of *Bacillus mycoides* by an indirect method.—*J. Bact.* 49, 617-622. 1966

The conditions under which the endospore of *B. mycoides* germinates have been studied. Endospores fail to germinate when suspended in a solution of potassium nitrate, either with or without a phosphate buffer; they will germinate normally in a solution of 2% glucose without any source of nitrogen in the media. If the solution is buffered with phosphate salts, growth as well as germination occurs. It is concluded that the endospores contain their own source of nitrogen, which is in such a form that it will not serve as a source of energy.—A. T. PHILLIPSON.

KLIGLER, I. J., GROSSOWICZ, N., & BERGNER, S. (1943.) Studies on the rôle of niacin and thiamine in the metabolism of glucose by *Staphylococcus aureus*.—*J. Bact.* 46, 399-403. 1967

Nicotinic acid is an essential factor in the metabolism of glucose by *Staph. aureus*. Without it, there is no fermentation and very little growth of the organism. In media containing nicotinic acid but no thiamine there is active growth but only partial utilization of available carbohydrate under aerobic conditions. In media containing both vitamins, two and a half times as much glucose is used as when nicotinic acid alone is present.

Under anaerobic conditions, the thiamine appears to have no effect on the glycolytic action, since the same amount of glucose is used in the presence of nicotinic acid, whether thiamine is present or absent. Thiamine accelerates the oxidation of glucose by resting cells by about four times.—I. W. JENNINGS.

LOVELL, D. L. (1945.) Skin bacteria. Their location with reference to skin sterilization.—*Surg. Gynec. Obstet.* 80, 174-177. [Abst. in *Bull. War. Med.* 5, 669, copied *verbatim*. Signed: L. P. GARROD.] 1968

Although chemical disinfection may render the skin almost bacteria-free, it may soon become heavily populated again, presumably owing to the growth of organisms in inaccessible sites. In order to identify these sites, Lovell excised pieces of skin and incubated them in a moist atmosphere for six hours, hoping that organisms would multiply and so become visible histologically. This hope was fulfilled: sections showed masses of bacteria deeply situated in hair follicles and sebaceous glands: these masses developed whether the skin had previously been "sterilized" or not. No bacteria were demonstrated in sweat glands.

FLETT, L. H., HARING, R. C., GUITERAS, A. F., & SHAPIRO, R. L. (1945.) The revival of organisms presumably killed by phenol.—*J. Bact.* 50, 591-595. [Authors' summary copied *verbatim*.] 1969

Both *Staphylococcus aureus* and *Eberthella typhosa* can be revived after treatment with dilutions of phenol that have heretofore been considered lethal. This revival can be accomplished physically by adding charcoal, or chemically by adding ferric chloride, to the subculture medium.

The dilution of phenol which kills *Staphylococcus aureus* in ten minutes but not in five is 1:65 in regular F.D.A. medium. This end point shifts to 1:55 or 1:50, depending upon whether activated charcoal or ferric chloride is used to inactivate the phenol sorbed by the transferred organisms. The same end point

for *Eberthella typhosa* shifts from 1:80 for F.D.A. medium to 1:65 when inactivated with ferric chloride.

GRUBB, T. C., & EDWARDS, M. A. (1946.) A method for restoring and maintaining the phenol resistance of certain strains of *Staphylococcus aureus*.—*J. Bact.* 51, 205-210. [Authors' summary copied *verbatim*.] 1970

Incubation of four cultures of *Staphylococcus aureus* (strain 209) at 40°C usually restored and maintained their phenol resistance at the standard prescribed by the F.D.A. for phenol coefficient determinations.

Phenol resistance increased by incubation at 40°C was maintained when the phenol coefficient test was conducted at 20°C and only slightly diminished when tests conducted at 37°C.

Standard phenol resistance, maintained by incubation at 40°C, was rapidly lost when the cultures were subsequently incubated at 37°C.

When strains of *S. aureus*, other than 209, were repeatedly transferred and incubated at 40°C, they failed to exhibit increased phenol resistance.

Incubation of certain *S. aureus* cultures at 40°C to restore or maintain standard phenol resistance is recommended when incubation at 37°C fails to produce the required resistance.

WEISER, R. S., & OSTERUD, C. M. (1945.) Studies on the death of bacteria at low temperatures. I. The influence of the intensity of the freezing temperature, repeated fluctuations of temperature, and the period of exposure to freezing temperatures on the mortality of *Escherichia coli*.—*J. Bact.* 50, 413-439. [Authors' summary slightly amended.] 1971

The purpose of this investigation was to assemble reliable quantitative data on the death of bacteria following low-temperature treatments which would be of value in elucidating the manner in which low-temperature injury is produced. The present study was limited to *Escherichia coli*. The suspending medium was 1 per cent. peptone or a peptone buffer mixture at pH 7.0.

Death by freezing involves rapidly acting or "immediate" death, caused by freezing and thawing *per se*, and a "storage death" which is a direct function of time and temperature. Mortality due to immediate death by freezing is marked but does not vary with the intensity of the freezing temperature. Immediate death occurs at a brief stage in the freezing process during which extracellular ice formation is being completed. The rate of storage death at the higher freezing temperatures is very rapid and is much greater at temperatures above -30°C. than at temperatures of -30°C. and below.

Repeated freezing is more lethal than a single freezing or storage in the frozen state for a similar interval of time. Freezing is much more lethal than supercooling [cooling below the freezing point of a liquid without the separation of solid matter]. Repeated fluctuations of temperature of frozen suspensions do not exert a lethal action additional to that of storage, but between -30°C. and -78°C. appear to result in a lower mortality than storage at either temperature. This protective effect was not noted at temperature ranges above -30°C. or below -78°C. Storage death at -195°C. either does not take place or is so slow that it is difficult to detect within the storage period of ten hours studied.

See also *abst.* 2018, 2141-2143, 2150, 2177 (staphylococci), 2020, 2071, 2129, 2130, 2188 (TB.), 2128 (anthrax), 2131 (swine erysipelas), 2125-2127 (mastitis), 2152 (*Corynebact. ovis*), 2176, 2178 (salmonella), 2144, 2151, 2152 (*B. subtilis*), 2189, 2192 (clostridia), 2137, 2138 (actinomycetes), 2050 (actinobacillus, necrobacillus in cattle), 2171 (bacteria in shock), 2137-2149, 2151, 2152, 2186, 2199 (antibiotics), 2192 (bovine pleuro-pneumonia).

DISEASES CAUSED BY PROTOZOAN PARASITES

CHANG, S. L. (1946.) Studies on *Entamoeba histolytica* IV. The relation of oxidation-reduction potentials to the growth, encystation and excystation of *Entamoeba histolytica* in culture.—*Parasitology*. 37. 101-112. [For part V, see V. B. 16. 42.] 1972

A close relation was found to exist between the oxidation-reduction potential in the culture medium and the growth, encystation and excystation of *E. histolytica*. C. shows that the protozoan is a strictly anaerobic organism which requires a strongly reducing state for its metabolic activity. This reducing state is provided by the accompanying bacteria.—C. HORTON SMITH.

*CARPANO, M. (1941.) Sopra un nuovo infusorio dell'apparato digerente degli equini, *Bertolinella intestinalis*. [A new infusorian, *B. intestinalis*, of the gastro-intestinal tract of the horse.].—*Riv. Parasit.* 5. 43. [Abst. from abst. in *Berl. Münch. tierärztl. Wschr.* [Wien. tierärztl. Mschr. Dec. 10th. 431. (1943).] 1973

A new oligotrichid ciliate, isolated from the faeces of a horse with chronic gastro-enteritis, is described under the name *Bertolinella intestinalis*.—U. F. R.

FIENNES, R. N. T.-W., JONES, E. R., & LAWS, S. G. (1946.) The course and pathology of *Trypanosoma congolense* (Broden) disease of cattle.—*J. comp. Path.* 56. 1-27. 1974

This article is based on observations on six adult cattle, all of which died, and ten calves, four of which died, after subcutaneous inoculation with a strain of *T. congolense*. The calves were born at the Entebbe laboratory and were all cross-bred.

The incubation period varied from 5-19 days. After 13-25 days a febrile reaction developed with a fluctuating temperature and death sometimes occurred at this stage, which is thought to correspond to the "trypanolytic crisis" of other authors. At the eighth to 12th week, surviving animals suffered a severe crisis period which is described as the "anaemic crisis". In adult animals which survived, the anaemia persisted, but calves began to recover. Trypanosomes were not found in blood smears of recovered animals or on sub-inoculation of susceptible animals. A second injection of the same strain of trypanosome sometimes produced a transitory infection. In observations on the blood changes, the red cell count fell rapidly from the initial crisis to about the 12th week, recovering to normal about the 26th week in surviving animals. The haemoglobin level was reduced in a similar manner, but the mean corpuscular haemoglobin tended to rise above normal at the anaemic crisis. In adults neutropenia gradually developed, but in calves the leucocyte count increased as a result of an increase in lymphocytes.

Chemical changes included some tendency to hypoglycaemia at the anaemic crisis, but in five animals there was a terminal increase in blood glucose. Other findings confirmed those of FRENCH [V. B. 9. 154] as regards increased chlorides and fluctuating calcium levels. The Ca : P ratio was severely disturbed in adult cattle, but not in calves; it is suggested that a disturbance of the mineral metabolism may be more significant than hitherto recognized. The gross pathological changes are given in a table, the most noticeable being a myxoedematous change of the fatty tissues, though it was not altogether constant. Lymph nodes were affected either locally or generally, the cortex being fibrous and the medulla often haemorrhagic. The kidneys always showed signs of necrosis; gastritis and enteritis were constant, but changes in the liver, spleen, lungs and heart occurred irregularly.

A table is also given of the histological findings which consisted of a widespread round cell infiltration with advanced fibrosis, in addition to which the lymph nodes, kidneys, thyroid gland, adrenals and the islet cells of the pancreas were affected.

In discussing these findings it is pointed out that trypanosomes were not found in the tissues, but the histological changes were the most constant feature of the disease. The blood alterations are considered as secondary to alterations in certain vital organs, for which some explanation other than toxin formation must be sought. It is suggested that the primary lesions are those of the thyroid and adrenals. The cause of death is considered to be circulatory failure, the lethal factor being the cellular and fibrous reaction. A variation in the reaction of the endocrine system may explain the recovery of calves. In view of the claim that true immunity occurs it is suggested that it is important to establish whether a multiplicity of strains has to be considered, or whether there are a number of subspecies which differ from each other in morphological, physiological and aggressive properties.

—U. F. RICHARDSON.

FIENNES, R. N. T. W. (1946.) *Trypanosoma congolense* (Broden) disease of cattle: the parenchymatous lesion and its relation to the cellular defences.—*J. comp. Path.* 56. 28-37. 1975

A single experiment is recorded in which a calf infected with *T. congolense* was kept in a room at 4°C. for an hour in the hope that the resulting constriction of the skin capillaries would drive the trypanosomes into the blood stream. An examination was made of the blood of the ear vein and of the jugular every 15 min.

In spite of the decrease of trypanosomes in the ear blood, the jugular blood content remained constant and it appeared that a trypanosome destruction rate of 1,000-3,000 per cu. mm. was maintained during the period. Large numbers of macrophage cells left the ear blood, and it is claimed that these cells ingested trypanosome debris, the parasites being destroyed by the internal body temperature and by a serum antibody, the presence of which was demonstrated by a comparison of the action of sera from infected and non-infected animals on slide preparations of trypanosomes.

Immobile, dead or disintegrated trypanosomes were found to be ingested by polymorphonuclear lymphocytes and monocytes, but after ingestion the polymorphs died, and were themselves ingested by monocytes which thus become the end-point of the process. It is claimed that the macrophage reserves are so depleted in this process that the vascular endothelium is dangerously affected, leading to thrombus-forming conditions, and multiple infarction of many essential organs.

The finding of a leishmania form of the trypanosome is recorded, and a note is added that development forms of the trypanosomes have been detected in the cutaneous and subcutaneous tissue. [These forms are not described.].—U. F. RICHARDSON.

BATTELLI, C., COCEANI, A., & ROSSI, M. (1944.) Ricerche sulla diffusione della leishmaniosi del cane in Eritrea. [The incidence of canine leishmaniasis in Eritrea.].—*Boll. Soc. ital. Med. Ig. trop. (Ses. Eritrea), Asmara*. 4. 497-505. [English summary.] 1976

Though human leishmaniasis occurs in Eritrea, the only case of canine infection had been one recorded in 1931. On the assumption that canine leishmaniasis might occur in a symptomless form, microscopic examination was made of the spleen and bone marrow

of 86 dogs, killed for various reasons in Asmara. Leishmania were detected in nine animals (8.62%) of which only one showed macroscopic evidence of infection (furfuraceous eczema). The formal-gel, lacto-gel, neostibamine and serum-flocculation tests were also carried out on all the animals, the serum-flocculation test giving results nearly agreeing with those of the microscopic examination; all the animals in which leishmania were found gave strongly positive flocculation, but two animals in which no parasites were found also gave positive results to the test.—U. F. RICHARDSON.

HORTON SMITH, C. (1946.) Some recent advances in the knowledge and control of coccidiosis in poultry.—*Harper Adams Util. Poult. J.* 31. 5-8. 1977

Coccidiosis of poultry is described as self-limiting, but infection is maintained by constant reinfection, and the vast majority of fowls carry coccidia. Disease production largely depends on the number of infective oocysts available, the most favourable conditions for oocyst development being moist surroundings and a temperature of 80°-90°F.

Clinical caecal coccidiosis usually occurs in young birds, but the resistance of adults results from sub-clinical infections. The experimental feeding of large doses of oocysts to chickens caused a high mortality, but feeding 200 or 100 oocysts caused none. The immunity resulting from infection increased with the severity of the original infection. When immunity was tested, 8.3% died of the surviving birds of a group originally fed 120,000 oocysts, but 11% died of the group immunized with 60,000 oocysts, 29% of the group immunized with 30,000 oocysts, 46-47% of those immunized with 100-200 oocysts, and 75% of birds previously kept free from infection.

For treatment, sulphamethazine sodium as a 0.2% solution in place of drinking water proved most useful, 2½ oz. sulphamethazine and ½ oz. caustic soda being dissolved in 1 pint of water, and 2½ oz. of this fluid diluted to 1 gal. If flock treatment is commenced as soon as blood is observed in the droppings of some of the birds the mortality can be reduced by as much as 60-70%, and birds which survive massive infections as a result of treatment become resistant. The value of sulphamethazine in duodenal coccidiosis is under investigation; preliminary results appear promising.

—U. F. RICHARDSON.

BISHOP, A., & GILCHRIST, B. M. (1946.) Experiments upon the feeding of *Aedes aegypti* through animal membranes with a view to applying this method to the chemotherapy of malaria.—*Parasitology*. 37. 85-100. 1978

The object of this work was to discover whether *Aedes aegypti* infected with *P. gallinaceum* would, when fed through a membrane, eject viable sporozoites and whether they would be ejected in numbers sufficiently large for experimental purposes. The method would enable the collection of sporozoites free from glandular tissue of the host so that the action of various drugs on the sporozoites could be tested directly. Membranes were prepared from chicken skin and it was found that the proportion of female *A. aegypti* which will gorge through the membranes is great enough for experimental purposes. The gorging reaction was shown to be stimulated by a heat gradient between the environment and the limiting membrane. Infection rates produced in this way were comparable to those produced when the mosquitoes were fed directly on living chickens. Infected mosquitoes were found to eject viable sporozoites into uninfected blood when they gorged through

membranes; the intravenous injection into young chicks of blood so infected produced results comparable in period of incubation and intensity to those obtained with bites from infected mosquitoes. The method was satisfactory for the purpose for which it was intended and for obtaining material suitable for study in tissue cultures.—C. HORTON SMITH.

ZAIN, H., & WOLF, A. (1943.) Einfluss der Röntgenstrahlen auf die Entwicklung der Endothelstadien der Vogelmalária (*Plasmodium gallinaceum*). [Effect of X-rays on the development of endothelial stages of *P. gallinaceum*.]—*Dtsch. tropenmed. Z.* 47. 68-71. 1979

No conspicuous success has attended attempts to influence the endothelial stages of malaria by therapy. Plasmoquin appears to be the only agent which has some effect on these stages in fowl malaria. The authors attempted to test the influence of X-rays on the development of these forms. Endothelial stages develop from sporozoites injected by mosquito bites and in *P. gallinaceum* are to be found mainly in the brains of fowls in the acute stage of blood infection. If material containing endothelial stages is introduced by inoculation the exo-erythrocytic forms develop further in the new host like the erythrocytic parasites and, as in malaria caused by insect bite, the endothelial stage infection appears almost simultaneously with the acute blood infection, and generally within the first eight days after the appearance of blood parasites. If erythrocytic forms are introduced by inoculation, then the infection by the endothelial stages only appears later, after acute blood malaria has abated. The authors consider that the mature erythrocytic forms which have completed their development in the red blood corpuscles are the source of the endothelial stages. At this stage the erythrocytic parasite is able to adapt itself to new conditions and grows into an endothelial form. For the present purpose, brain tissue containing endothelial stages was used. Sections of brain which contained endothelial stages were subjected to 200 r. (0.5 mm. Cu 180 KV at 40 cm.) immediately after the animal had been killed. Birds were inoculated intramuscularly with the treated tissue and others were given the same amount of untreated tissue. The results showed that X-rays at this dosage did not affect the endothelial stages. The first development of the endothelial stages takes place in the endothelial cells, and mainly in the cells of the reticulo-endothelial system. Only at a later stage do these forms mature in the capillaries of certain organs, chiefly the brain in the case of *P. gallinaceum*. Further investigations were made to ascertain whether total X-ray treatment of the animal during the first period of the development of endothelial stages would exert any influence on these forms, which might be observable in the extent to which the brain was infected later by these endothelial stages. Two birds were given intramuscular inoculations with the same amounts of infected brain. One bird was treated with X-rays twice during the first week after inoculation. In repetitions of this experiment, the time of ray treatment and size of dose were varied. Some birds received their first X-ray treatment soon after inoculation; others were treated 2-3 days after inoculation. A second treatment was usually given 3-4 days after the first. The smallest single dose was 150 r., but 200 r. was usually given and, in some cases, 300-400 r. The second dose was the same as the first, or 50 r. stronger. The maximum amount given in both treatments combined was 700 r. The birds tolerated single doses of 300 r. or 400 r. so that their sensitivity

to X-rays cannot be high. The conclusions to be drawn are that the application of X-rays to the whole animal, at the dosages used, did not prevent, nor perceptibly lessen, the endothelial stage infection of the brain. After the administration of small doses it was observed that there was a marked increase of endothelial stages in the brain in a number of cases, compared with control birds. This may be due to the increased activity of the reticulo-endothelial system produced by X-rays. The authors point out that it is difficult to assess the complicated results of X-ray treatment when it is applied to the whole animal, as individual organs and cell systems show varying sensitivity towards particular doses of X-rays.—C. HORTON SMITH.

PATTISON, I. H. (1945.) Tick-transmitted protozoa in the peripheral blood of clinically healthy cattle in Palestine.—*J. comp. Path.* 55. 243-249. 1980

An examination was made of blood smears from 550 clinically healthy cattle from various areas, of Palestine, to ascertain how far the finding of protozoa could be accepted as explanation of disease and to obtain information as to the prevalence of carrier animals. Smears were examined for 5 min. each. In no case were parasites more numerous than 1 in 3 fields.

Parasites were found in approximately 47% of all single smears examined. In a small number of animals smears were taken at intervals over periods of some weeks and from the results in these animals it is concluded that the 47% infection rate must be considered as a minimum; it might be justifiable to suggest that repeated examinations of smears of peripheral blood would probably reveal that the great majority of cattle are carrying parasites. The age of the animals made little difference to the infection rate detected, 6-year-old animals showing a 48% infection rate and 2-year-olds 54%.

Anaplasma marginale and *Theileria parva* were commonly found. *Babesia bigemina* was found only occasionally, although it is on record that this parasite appears in large numbers of animals following splenectomy. *Babesiella berbera* [= *Babesia argentina*] was not encountered although it is known that carriers of this parasite exist. It is suggested that the finding of this last parasite in peripheral smears is probably indicative of a clinical infection.—U. F. RICHARDSON.

*BABUDIERI, B. (1940.) Agglutinine per leptospire nel siero di cani di Milano. [*Leptospira agglutinins in the sera of dogs in Milan.*]—*Boll. Soc. ital. Biol. sper.* 15. 833-835. [Abst. from abst. in *Berl. Münch. tierärztl. Wschr./Wien. tierärztl. Mschr.* Dec. 10th. 432. (1943).] 1981

35.3% of dogs examined in Milan gave positive agglutination reactions for leptospirosis.—U. F. R.

HUTSON, L. R. (1945.) Further observations on canine leptospirosis in Antigua, B.W.I.—*Canad. J. comp. Med.* 9. 326-330. 1982

The article is based on one case attributed to the *canicola* type of infection and on a report of experimental vaccination, employing a commercially prepared bivalent antigen.

The history, P.M. findings and especially the histopathology of the case are reported in considerable detail. In the vaccination trials the vaccine was given in 2 ml. doses to 25 dogs. The results were considered promising. A second group of 40 dogs received three injections of 3 ml. at seven-day intervals. Of the second group, two dogs died from leptospirosis which was believed to be an ante-vaccinal infection.—P. J. G. PLUMMER.

MATHEWS, F. P. (1946.) A contagious disease of cattle associated with leptospira.—*Amer. J. vet. Res.* 7. 78-93. 1983

An infectious disease of cattle first observed in the late summer of 1942 in Texas is described. The histology of the lesions resembled that of leptospirosis in dogs and organisms resembling leptospira were demonstrated in liver and kidney sections. These organisms were not proved to be the causal agents and some other infectious agent may be involved.

In the first outbreak studied the morbidity at its peak was 40% in a herd of 1,700 head of cows and calves; deaths numbered 450. Many of the cows aborted and in the following year the calf crop was only 63% as compared with 90% in the preceding years. The total monetary loss was estimated at \$35,000. In another herd of 1,360 head of cattle in 1942, deaths totalled 80 and there were many abortions. The disease persisted on this ranch and between June 1942 and March 1945, 249 cows and calves died and there were 350 abortions. The same disease was encountered on the Agricultural Experiment Station at Balmorhea, Texas, in a group of 130 young bulls collected from six different ranches, and sporadic cases were seen on other ranches.

Early symptoms included fever, nasal discharge, rapid respiratory rate, some loss of appetite and, occasionally, diarrhoea. Recovery sometimes took place then, or the disease took one of three forms. In the mildest form there was generally diarrhoea lasting for up to six days, with marked loss of weight, followed in most cases by recovery. In other animals an acute fatal form occurred, characterized by haemoglobinæmia and haemoglobinuria. In other more chronic cases there was sometimes transitory haemoglobinuria with diarrhoea lasting for weeks and possibly followed by constipation. Muscular weakness occurred, with swaying of the hindquarters and there was gradual emaciation, in spite of a reasonably good appetite. Scab formation on the muzzle occurred as a result of encrustation with the nasal discharge and in many cases yellow discoloration of the hair and skin was seen. Abortion occurred even in mild cases.

Findings P.M. included a golden yellow coloration of the fat so that the fat of a Hereford carcass resembled that of a Jersey. The liver had a faint yellow colour deepening into an orange-yellow after a few minutes' exposure to air or light. In some livers small necrotic foci could be seen. Numerous small haemorrhages and ulcerations were seen in the abomasum. The microscopic appearances of the liver, kidneys and placenta are described in detail and illustrated.

The first attempts to transmit the disease to healthy calves, yearlings and a cow by subcutaneous and intravenous injections of tissue emulsions and blood, by feeding and by contact were unsuccessful. As a result plant poisoning was suspected, but no likely plant could be found. At a later date further attempts at transmission were made, using Hereford cattle maintained at the laboratory. These attempts were either negative or resulted in very mild cases characterized by a short period of fever, slight nasal discharge and diarrhoea lasting a short time.

It was thought that some immunity existed in the laboratory herd of Herefords and so seven Jersey calves were purchased. Four of these and five Herefords each received 10 ml. intravenously, 5 ml. subcutaneously and a few drops instilled into the eye of defibrinated blood from a mild case. The remaining three Jersey calves were left as controls. All four inoculated Jersey calves developed a temperature reaction and nasal discharge; one calf had diarrhoea with quick recovery and no after-effects and another had diarrhoea lasting for a week with considerable loss of weight. None of the inoculated Hereford cattle or the Jersey controls reacted.

Blood inoculated intraperitoneally into rabbits had no ill-effect, but a condition characterized by grey, atrophic kidneys was transmitted to g. pigs through three passages. Goats and sheep could not be infected.

Organisms resembling leptospira were demonstrated in sections of liver and spleen stained by the Warthin-Sterry method in some, but not all cases. Only one pregnant animal was examined P.M. and the leptospira-like organism was demonstrated in the chorionic villi. The organism was not found in tissues from the artificially infected g. pigs. Sera from nine cases were tested for agglutination with *L. ictero-haemorrhagiae* and *L. canicola* with negative results.

Sulphanilamide is stated to be of benefit if given in the early stages. The disease resembles that described by Russian workers, the cause of which is believed to be a leptospira [see *V. B.* 7. 412, 12. 531, 13. 422, and 15. 276].—M. C.

POURSINES, Y., & RANQUE, J. (1944.) Le voie sous-conjonctivale oculaire utilisée pour conférer la leptospire ictero-hémorragique expérimentale au cobaye. [The subconjunctival route for transmission of leptospira in guinea pigs.]—*C. R. Soc. Biol. Paris*. 138. 673-674. 1984

Of three g. pigs inoculated intraperitoneally with 3-4 ml. of brain emulsion from animals infected with

also absts. 2153-2155 (avian coccidiosis), 2180 (trypanosomiasis), 2024 (tick-borne protozoa of cattle), 2098, 2099 (ruminal protozoa).

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

*MAHLSTEDT, H. (1944.) Gedanken über Wesen und Kampf gegen die Maul- und Klauenseuche. [The nature and control of foot and mouth disease.]—*Forschungsdienst*. 17. 139. [Abst. from abst. in *Berl. Münch. tierärztl. Wschr./Wien. tierärztl. Mschr.* August 18th. 273-274. (1944).] 1986

M.'s conception of the nature of F. & M. disease is unorthodox and assumes the existence in susceptible animals of a specific constitutional predisposing sensitivity.—W. M. HENDERSON.

RAMON, G., BÉNARD, H., BOQUET, P., RICHOU, R., TISSIER, & RATNER. (1942.) Sur un sérum doué de propriétés anti-infectieuses spécifiques obtenu chez le cheval, soit au moyen du virus de la vaccine très actif, soit à l'aide de même virus rendu avirulent par l'action du formol et de la chaleur (anavirus). Etude expérimentale. [A specific anti-infectious serum from horses either from an active vaccine virus or the same virus rendered avirulent by formol and heat.]—*Bull. Acad. Med. Paris*. 126. 314-318. 1987

Horses respond to subcutaneous and intradermal inoculations of vaccine virus by a rapid and abundant production of antibodies. Their sera neutralize the virus *in vitro* and passively immunized rabbits are protected against the virus applied by scarification. No difference was observed in the antibody response of horses inoculated with live virus or with virus attenuated by formol and heat.—M. L. LEVI.

CASALS, J. (1945.) The technique and practical applications of the complement-fixation test for diagnosis of infection with encephalitis viruses.—*J. Bact.* 50. 1-5. 1988

Ultra-violet light inactivated and lyophilized antigens were prepared using Western equine encephalomyelitis, Eastern E.E., St. Louis encephalitis and West Nile viruses. These antigens were found to have retained all the properties of freshly prepared antigen following storage at 4° C. when tested after two years

L. ictero-haemorrhagiae, only one developed clinical symptoms of infection. Six g. pigs inoculated sub-conjunctivally with 0.2 ml. of the same emulsion all developed symptoms.—U. F. RICHARDSON.

LESKIEN, I. (1944.) Die Hundeseuche und ihre Behandlung. [Canine leptospirosis and its treatment.]—*Berl. Münch. tierärztl. Wschr./Wien. tierärztl. Mschr.* June 9th. 189-190. 1985

A disease of dogs, resembling Stuttgart disease and believed to be a leptospirosis, has been very prevalent in Frankfurt and other German cities. The disease is characterized by a brown-red discoloration of the conjunctiva, enlargement of the liver, diarrhoea, weakness, muscular cramps and, sometimes, ulceration of the gums.

Prognosis is bad if vomiting occurs, but it can sometimes be controlled by administering bismuth subnitrate. The injection of soluble eubasin [sulphapyridine], 3 ml. daily for three days, is recommended for strong dogs and the same dose on alternate days for weak dogs. Vitamin C is recommended for the detoxication of the liver and B vitamins for the muscular weakness of the hind quarters. It is advocated that drinking water should be withheld and replaced by camomile tea in which glucose can be given. The use of a proprietary preparation ("sepdelen" no. 7 or no. 8) is also recommended as an alternative.—U. F. R.

in the case of Western E.E. and after 2-3 months in the case of the other viruses. Hyperimmune sera with specific titres of 1:32 to 1:256 were obtained from g. pigs for Western E.E., Eastern E.E., and Venezuelan E.E., and from mice for St. Louis encephalitis and lymphocytic choriomeningitis. Non-specific reactions were common with serum dilutions of less than 1:4.

C. concluded that Venezuelan E.E. is not related to Western or Eastern E.E., that strains of Western E.E. may differ in their capacity to develop complement-fixing antibody and that the relationship between Western and Eastern E.E. is not clear.—W. M. H.

HAMMON, W. McD., REEVES, W. C., & IZUMI, E. M. (1946.) St. Louis encephalitis virus in the blood of experimentally inoculated fowls and mammals.—*J. exp. Med.* 83. 175-183. [Authors' conclusions copied *verbatim*.] 1989

1. Of three species of mammals tested by peripheral inoculation (guinea pig, cat, and horse) none showed viremia under conditions which suggested that any of these species would serve as a frequent source of mosquito infection.

2. Of the birds tested (chicken, duck, and dove) all developed viremia and might readily serve as natural sources of mosquito infection. Chickens were shown to be very highly susceptible to infection by minute amounts of virus inoculated subcutaneously.

3. Virus may appear in the blood of chickens within 16 hours after inoculation and it has persisted till at least the 120th hour. No fowl showed any sign of illness as a result of the infection.

EKLUND, C. M. (1946.) Human encephalitis of the Western equine type in Minnesota in 1941: clinical and epidemiological study of serologically positive cases.—*Amer. J. Hyg.* 43. 171-193. [Author's summary copied *verbatim*.] 1990

1. An epidemiological study of cases of acute encephalitis occurring during 1941 and having sera

neutralizing 40 m.l.d. or higher of the Western equine encephalomyelitis virus has been made.

2. The highest attack rates in acute encephalitis occurred in the west central and northwestern parts of the state, in areas devoted to grain farming and having a low density of population and a low average number of domestic animals as compared with the southern part of the state.

3. No evidence was obtained that would indicate that domestic animals are the important factor causing human infection.

4. Acute encephalitis due to the Western equine virus differs from paralytic poliomyelitis in seasonal incidence, sex, age, and geographical distribution, indicating different methods of spread of these two diseases.

NORRIS, M. (1946.) Recovery of a strain of western equine encephalitis virus from *Culex restuans* (Theo.) (Diptera: Culicidae).—*Canad. J. Res. Sect. E.* 24. 63-70. [Author's abstract copied verbatim.] 1991

Since an epidemic of western equine encephalitis in Manitoba in 1941, attempts have been made each year to isolate the virus from mosquitoes collected during the summer months. In 1942, 94 pools of mosquitoes were tested; 43 of the genus *Aedes*, 36 of *Culex* and 15 of *Culiseta*. Suspensions made from each pool, which consisted of from 1 to 30 insects, were injected intracerebrally into guinea pigs. No isolation of virus was made. In 1943, 69 pools were tested: 49 of *Aedes*, 6 of *Culex*, 1 of *Culiseta*, 1 of *Anopheles*, and 12 of mixtures of different genera. Each suspension was derived from 10 to 75 mosquitoes and was injected intracerebrally into Rockefeller strain Swiss mice. There was no recovery of virus. In 1944, 90 pools were tested: 10 of *Culex*, 74 of *Aedes*, and 6 of *Culiseta*. Suspensions were usually made from 70 to 100 insects, and injected intracerebrally into Swiss mice of the Rockefeller strain. From one pool of *Culex restuans* (Theo.), a strain of western equine encephalitis virus was recovered.

KOPROWSKI, H., & LENNETTE, E. H. (1946.) The comparative sensitivity of Venezuelan equine encephalomyelitis virus neutralization tests in chick embryos and in mice.—*J. Bact.* 51. 257-261. [Authors' summary copied verbatim.] 1992

The neutralizing capacities of Venezuelan equine encephalomyelitis immune sera were determined by inoculation of the same serum-virus mixtures onto the chorio-allantoic membrane of fertile eggs, and intracerebrally or intraperitoneally into mice. The results indicate that the sensitivity of the egg test is essentially similar to that of the intracerebral mouse test and much less than that of the extraneural mouse test.

DU TOIT, R. M. (1944.) The transmission of blue-tongue and horse-sickness by *Culicoides*.—*Onderstepoort J. vet. Sci.* 19. 7-16. 1993

An attempt was made to demonstrate the virus of the two diseases in adult blood-sucking insects caught in the wild state, the first positive result being obtained with insects caught in light traps, consisting of a light placed beneath a catching cage, above which was a fan. The draught of the fan was not sufficiently strong to hold insects against the fabric of the cage, but was strong enough to prevent them from flying down. The collecting cage was covered with organdie and the inlet tube was projected well into the chamber to allow trapped insects to move out of the ascending column of air. A 75-watt bulb was found to give the best results.

The insects were removed from the cage by an aspirator, being brought to the required part of the cage by their phototropic response to a light. Selection of

insects for inoculation purposes was made after drawing a small quantity of ether vapour into the aspirator, and emptying the lightly anaesthetized insects into a petri dish. For storage purposes *Culicoides* were kept in small wooden cages and fed on 10% sugar solution, soaked raisins and slices of apple, but the mortality was high as the insects inclined to stick to moist surfaces.

Injections were made intravenously and sometimes caused death from shock, but this could be avoided by an initial injection of 5 ml. of the insect emulsion subcutaneously. The injection of emulsion of wild *Culicoides* into three sheep produced typical symptoms of blue tongue after incubation periods of 3-6 days, the animals later proving immune to virus injection. In a horse, injection resulted in a febrile reaction indistinguishable from horse sickness; the subinoculation of blood into a second horse caused a fatal attack of horse sickness of a mixed pulmonary and "dikkop" type. *Culicoides* fed on one of the reacting sheep in September, and on another sheep ten days later caused a typical blue tongue reaction, but wild *Culicoides* caught in March, April and May failed to transmit either blue tongue or horse sickness.

It is concluded that certain species of *Culicoides* are capable of transmitting the virus of blue tongue by biting, and it is anticipated that the transmitter of horse sickness will be found within the genus *Culicoides*.

—U. F. RICHARDSON.

FORTNER, J. (1944.) Über das Dauervirus-trägertum bei ansteckender Blutarmut der Einhufer. [Duration of the carrier state in equine infectious anaemia].—*Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* 52/50. 265-266. 1994

F. records the case of a horse which remained for seven years a carrier of the virus E.I.A. following artificial infection in 1936. From 1937-43, at approximately yearly intervals, nine horses were inoculated subcutaneously with blood from the carrier animal. The results of these inoculations were all positive, except for the fourth which was negative and the seventh which was doubtful.—W. M. HENDERSON.

*TOPOLNIK, E. (1943.) [Effect of phenyl hydrazine administration on the diagnosis of equine infectious anaemia in experimentally infected rabbits.]—*Vet. Archiv. No. 7.* p. 249. [Abst. from abst. in *Berl. Münch. tierärztl. Wschr./Wien. tierärztl. Mschr.* August 18th. 270. (1944).] 1995

T. considers that the finding of haemosiderin in the liver following the injection of phenyl hydrazine into rabbits experimentally infected with E.I.A. is not sufficiently specific to warrant diagnosis of the disease. Haemosiderin was also found following the injection of phenyl hydrazine alone and following the injection of normal horse and pig sera.—W. M. HENDERSON.

*CANESSA, S. (1942.) Sulla siero-terapia della peste bovina. [Serum therapy of rinderpest].—*Azione vet.* 11. 294. [Abst. from abst. in *Jber. Vet.-Med.* 71. 127.] 1996

After referring to the view generally held that immune serum is of no value in the treatment of rinderpest, C. describes good results obtained after injecting immune and fresh cattle serum into infected animals and suggests further trials.—J. E.

PALLASKE, G. (1944.) Zur pathologischen Anatomie der infektiösen Bronchitis und Bronchopneumonie des Rindes und ihre Differentialdiagnose. [Pathology of infectious bronchitis and broncho-pneumonia of cattle and their differential diagnosis].—*Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* 52/50. 337-341. 1997

P. discusses the pathology of bronchitis and pneumonia in cattle and illustrates by reference to selected cases. A plea is made for the accurate recording of P.M. findings in conditions affecting the respiratory tract in cattle, so that an attempt may be made to clarify the aetiology and differential diagnosis of so-called true pneumonia, infectious bronchitis and broncho-pneumonia.—W. M. HENDERSON.

*MÜLLER, E. (1943.) Das Auftreten der Schweinepest beim Schwarzwild in freier Wildbahn. [Incidence of swine fever in wild boars.—Z. Jagdk. 4. 86. [Abst. from abst. in Dtsch. tierärztl. Wschr. (Tierärztl. Rdsch. 51/49. 218.] 1998

In the middle part of the southern Pfalz district of Bavaria wild pigs died in large numbers. When hunted, sows appeared to be tired and made no attempts at flight. In ten cases S.F. or suspected S.F. was diagnosed and in one case *Salmonella typhi-suis* was isolated.—J. ZWEIF.

YOUNG, L. E., & CUMBERLAND, M. C. (1943.) The mouse-adapted Lansing strain of poliomyelitis virus. III. Comparison with a strain of mouse encephalomyelitis virus isolated from the intestines of normal mice.—*Amer. J. Hyg.* 37. 216-224. 1999

A filtrable virus, presumably a strain of mouse encephalomyelitis virus, has been isolated from the pooled intestinal contents of five normal Swiss mice. The clinical picture produced in mice by the intracerebral inoculation of this strain is distinctly different from that produced by the Lansing strain of poliomyelitis virus. Moreover, no evidence of immunological relationship can be demonstrated between the two viruses.—I. W. JENNINGS.

HORSFALL, F. L., JR., & CURNEN, E. C. (1946.) Studies on pneumonia virus of mice (PVM). II. Immunological evidence of latent infection with the virus in numerous mammalian species.—*J. exp. Med.* 83. 43-64. [Authors' summary slightly amended.] [For part I, see V. B. 16. 301.] 2000

The results of neutralization tests with PVM and serum obtained from numerous animal species indicate that antibodies against this virus were present in the blood of all mammalian species tested, but not in that of fowls, and that their incidence in various species was widely different. They indicate, also, that in certain species, particularly the cotton rat, there were marked seasonal variations in the incidence of such antibodies; in the late winter and spring the incidence was much higher than during the summer and fall seasons. Cotton rats and hamsters which did not possess neutralizing antibodies against PVM were susceptible to manifest pulmonary infection with this virus, irrespective of the effects of previous experiments upon them, whereas those which possessed such antibodies were immune. It is suggested that circulating antibodies against PVM were present as a result of preceding infection with a latent virus; either PVM or an agent closely related to it in antigenic composition.

Appropriate non-specific stimuli, e.g., the intranasal injection of suspensions of normal chick embryos, induced the development of neutralizing antibodies against PVM with significantly greater frequency in each of three species than occurred in control animals. Materials derived from patients with primary atypical pneumonia yielded results almost identical to those obtained with normal chick embryo suspensions. It is suggested that such materials, like the other non-specific stimuli employed, were effective in evoking a specific antibody response, because they unbalanced an equilibrium which previously existed between animal host and latent pneumotropic virus.

MORCOS, Z. (1946.) Fowl plague in Egypt. Immunisation. Mouse neurotropic fixed virus.—*Vet. J.* 102. 3-10. 2001

M. describes attempts to infect white mice by intracerebral inoculation with virus, the origin of which is not stated. In the first passage each of two mice died on the seventh day. Seven serial passages, in each case using two mice, were effected. By the fifth passage the interval between inoculation and death had been reduced to three days.

Attempts were made to prepare a vaccine from material of the seventh passage, by drying and by treatment with both ether and phenol. The dry phenolized material proved to be virulent. Fresh brain material emulsified in glycerin and treated with ether was avirulent but failed to protect chicks against test inoculations.—M. C.

ANON. (1945.) Neurotropic virus diseases.—*Bull. U.S. Army med. Dep.* 4. 322-323. 2002

This article gives no new information but includes a tabular summary of the important features of the more common neurotropic virus diseases affecting man.

—W. M. HENDERSON.

OLSON, B. J., & LARSON, C. L. (1945.) An epidemic of a severe pneumonitis in the bayou region of Louisiana. V. Etiology.—*Publ. Hlth Rep., Wash.* 60. 1488-1503. [Authors' summary copied *verbatim*.] [For part IV, see V. B. 15. 229.] 2003

1. A virus has been isolated from three cases of severe pneumonitis in the bayou region of southwestern Louisiana.

2. It appears to be a new member of the psittacosis-lymphogranuloma venereum group of viruses and may be distinguished by its pathogenicity for guinea pigs and its infectivity for mice inoculated by subcutaneous or intramuscular routes.

GEAR, J., YEO, R. M., & MUNDEL, B. (1945.) Studies in poliomyelitis. [I.]—*S. Afr. med. J.* 19. 262-264. [Authors' summary copied *verbatim*.] 2004

GEAR, J. H. S., MUNDEL, B., & WILSON, D. (1946.) Studies in poliomyelitis. III. The isolation of the virus of poliomyelitis from sewage in Johannesburg.—*Ibid.* 20. 139-140. [Authors' summary copied *verbatim*.] [Part II in press.] 2005

1. 1. An investigation of poliomyelitis was undertaken at the South African Institute for Medical Research in collaboration with the Public Health Department, Johannesburg, and the Union Health Department.

2. It was shown that the common South African vervet monkey *Cercopithecus aethiops pygerythrus* is susceptible to the virus of poliomyelitis, and suitable for the study of the disease.

3. The distribution of the virus in a small children's home in which a case of poliomyelitis had occurred was studied. It was shown that two of seven healthy contacts were excreting the virus in their faeces. One of these contacts still excreted the virus one month after its presence was first detected, but no virus was detected two months later.

4. The findings are discussed and the analogy between poliomyelitis and meningococcal meningitis, and between human poliomyelitis and mouse poliomyelitis, is noted.

III. The isolation of the virus of poliomyelitis from the sewage in Johannesburg is described. The virus was not detected in the final effluent after the process of purification in the sewage works. The possible significance of the finding is discussed, and it is noted that the role of infected faeces and sewage in

the spread of poliomyelitis has not yet been clearly determined.

OLIPHANT, J. W., & HOLLAENDER, A. (1946.) Homologous serum jaundice. Experimental inactivation of etiologic agent in serum by ultraviolet irradiation. —*Publ. Hlth Rep., Wash.* 61. 598-602. [Authors' summary copied *verbatim*.] 2006

Dried human icterogenic serum was reconstituted and irradiated with ultraviolet light for periods of 1, 6, and 30 minutes. Each irradiated specimen was inoculated subcutaneously into 12 individuals in doses of 0.5 cc. in dilution of 1:4. A control group of 12 received the same dose of nonirradiated serum.

Subsequently 4 cases of jaundice appeared in the control group after 12-, 13-, 13-, and 13-week intervals. One case of jaundice occurred after 12 weeks in the group receiving material irradiated for 6 minutes.

MURPHY, W. J., PETRIE, L. M., & WORK, S. D., Jr. (1946.) Outbreak of infectious hepatitis, apparently milk-borne. —*Amer. J. publ. Hlth.* 36. 169-173. [Authors' summary copied *verbatim*.] 2007

The evidence gathered during the course of this investigation, while purely circumstantial in character, points quite definitely toward a single milk supply as the source of the outbreak. The sequence of events and the distribution of cases follow the general pattern observed in milk-borne outbreaks of other diseases. It was established that, prior to the outbreak, at least 2 cases of infectious hepatitis lived in close proximity to the source of the milk supply. Conditions at the dairy were such that contamination of the milk was possible. Subsequently, within the limits of the incubation period, cases appeared among consumers of the milk but not among non-consumers who were 20 times more numerous. Considering the conditions at the dairy, together with the observed distribution of cases, the possibility of the outbreak being unrelated to the milk supply appears to be remote.

HERZBERG, K. (1944.) Uebertragungsversuche an Kanarienvögeln mit Hepatitis-contagiosa-Material. (Mit einem Anhang: Der Kanarienvogel als Versuchstier.) [Experiments on transmission of infective hepatitis to canaries: the canary as an experimental animal.] —*Zbl. Bakt. I. (Orig.)* 151. 81-106. [Abst. in *Bull. War Med.* 6. 92-93, slightly amended. Signed: F. O. MACCALLUM.] 2008

The evidence presented suggests that even if the canary can be infected occasionally with the causative agent of infective hepatitis, it is of little practical use as an experimental subject for the study of this disease.

The author comments at length on the difficulties of using the canary for such experiments, because of the high percentage of natural infections with coccidia and toxoplasma. More than 400 birds have been inoculated in these studies.

Inoculations of blood or urine from cases of hepatitis in Greece and Germany are said to have produced positive results 16 times. In 12 of the 16, blood was taken one or two days before the onset of jaundice. Negative results were obtained 24 times. Even in a positive experiment, only one or two birds were affected out of an average of 40 to 60 under the same conditions.

When a positive result is obtained, the incubation period is 30-70 days. The clinical symptoms are said to be characterized by alternate ruffling and smoothness of plumage, listlessness, increasing lassitude and atrophy of the breast muscles. It is admitted that the symptoms are not specific for this disease.

Some birds died after an illness of 3-15 days, others recovered. Histological examination of dead or killed birds showed necrosis of hepatic parenchymal cells in those dying early in their illness, and bile duct proliferation in many of those which recovered. These changes were also found in birds dying from other causes, such as coccidiosis.

The author draws attention to the marked contrast between his findings and the incubation period and clinical symptoms described by DRESEL, MERDING and WEINBECK, in their reported transmission of infective hepatitis to the canary.

CRAIGIE, J., WATSON, D. W., CLARK, E. M., & MALCOLMSON, M. E. (1946.) The serological relationship of the rickettsiae of epidemic and murine typhus. —*Canad. J. Res. Sect. E.* 24. 84-103. 2009

Complement-fixing antibodies in epidemic and murine typhus immune sera were differentiated by quantitative absorption tests. The neutralizing antibodies that participate in the Giroud reaction were differentiated by quantitative inhibition tests. Epidemic and murine typhus immune sera were shown to contain two kinds of complement-fixing antibodies and two kinds of neutralizing antibodies. The antigens that reacted with these differed in specificity and thermal resistance. Cross-reactions were due to similar heat-stable antigens in the two types. Type-specific sera were obtained by absorption with heterologous or heated homologous type rickettsia. The specific antibodies reacted only with the heat-labile antigens of the homologous type. Mice were actively immunized against the toxic factors of murine and epidemic rickettsia. The immunity was type specific and dependent on the presence of heat-labile antigen in the vaccine. —R. GWATKIN.

GIROUD, P. (1945.) Infection du poumon de mouton avec le virus du typhus historique. [Pulmonary rickettsial infection of the sheep.] —*C. R. Soc. Biol. Paris.* 139. 280-281. 2010

In preparing sheep-lung typhus vaccine, the resistance of the sheep is first reduced by bleeding or the administration of sulphonamides which greatly facilitate rickettsial multiplication. After anaesthetization a pulmonary inundation is obtained by the introduction by means of a transfusion apparatus of 10-15 g. of infected rabbit lung suspended in about 100 ml. of liquid. After a febrile reaction the temperature drops to about 34°C. on the fourth or fifth day, the animal becoming comatose. Autopsy reveals oedema and hepatization of the lungs which weigh about 1,000 g. Rickettsia can be detected as vibrios or granular bodies, but are not as numerous as they are in rabbit or dog lung. Sheep lung emulsion produces typhus reactions in mice, g. pigs and rabbits, but milder than do rabbit and dog lung. Formalized vaccines made from sheep lung are not as satisfactory as those from dog or rabbit lung as judged by their protective value in g. pigs.

—U. F. RICHARDSON.

MITSCHEHLICH, E. (1943.) Die Übertragung der Kerato-Conjunctivitis infectiosa des Rindes durch Fliegen und die Tenazität von Rickettsia conjunctivae in der Aussenwelt. [Transmission of infectious bovine kerato-conjunctivitis by flies and the viability of *R. conjunctivae*.] —*Dtsch. tropenmed. Z.* 47. 57-64. 2011

M. points out that rickettsial conjunctivitis of cattle is principally a disease of pastures appearing in April or May, with a peak of cases in August. It is more prevalent in hot summers and in damp localities.

Although fly transmission has been suggested, no proof of its occurrence has been produced.

Working with *Musca domestica* and *Stomoxys calcitrans* M. found that flies fed on the eyelids of infected animals and transferred to the eyelids of healthy animals within eight hours transmitted the disease: in one experiment *M. domestica* proved infective after 24 hours. No hereditary transmission through the egg of either species of fly could be demonstrated. An account is given of HASE's method of rearing flies for these experiments.

Experiments to ascertain how long rickettsial material remained infective, indicated that at summer temperature, in normal saline solution, infectivity might persist for 24 hours, but not for 48 hours.

Material allowed to dry on a slide lost infectivity within 24 hours and stalls in which infected animals had been kept did not prove infective after 24 hours, even though bedding and food were not removed and no disinfection was undertaken.—U. F. RICHARDSON.

COOK, C. E. (1944.) Observations on the epidemiology of scrub typhus.—*Med. J. Aust.* November 18th. 539-543. 2012

Several outbreaks of scrub typhus in troops in New Guinea are described, C. concluding that its vectors are not the trombidid mites responsible for scrub itch and suggesting that the epidemiology of the disease is consistent with its transmission by larval ixodid ticks. Ticks taken from rodents in the vicinity of endemic foci belong to the genus *Haemaphysalis* (species not yet identified). It is reported that in the Bulolo Valley, always mite infested, scrub typhus was not reported until some months after the first introduction of cattle. A possible explanation is that a tick vector was introduced with the cattle.—H. McL. GORDON.

MORTON, H. E., & ENGLE, F. B., JR. (1945.) Dysentery bacteriophage. Review of the literature on its prophylactic and therapeutic uses in man and in experimental infections in animals. pp. 25. Chicago, Ill.: American Medical Association. Reprinted from *J. Amer. med. Ass.* 127, 584-591. 2013

The authors conclude that, although dysentery bacteriophage has been shown to prevent or cure experimentally induced infections with dysentery bacilli in laboratory animals, owing to the inconclusive nature of most reports there is insufficient evidence to

show whether or not the therapeutic or prophylactic use of dysentery bacteriophage in man is of value.

If the criterion for cure is the disappearance of the bacilli from the faeces it is important that repeated cultures be made using the technique of KLIIGLER *et al.* (1943) which permits cultivation of bacilli in the presence of bacteriophage by its inactivation with 1:10,000 to 1:7,500 formalin for six, 18 and 24 hours.

—W. M. HENDERSON.

MORTON, H. E., & ENGLE, F. B., JR. (1945.) The protective action of dysentery bacteriophage in experimental infections in mice.—*J. Bact.* 49, 245-255. 2014

Dysentery phage, produced from a strain of *Bacterium flexneri*, protected mice against a dose of 10,000 M.L.D. of three different strains of *Bact. flexneri*, the homologous strain being lysed at a ratio of one phage particle to eight bacterial cells. Two other strains were lysed at ratios of 1:7 and 1:5 respectively. All three strains were lysed *in vitro* by this phage. One other strain was lysed neither *in vitro* nor *in vivo*, and it is assumed from this that *in vitro* activity is indicative of *in vivo* activity.

The phage gave complete protection to the mice when given up to three hours after the infecting dose, and partial protection when given up to six hours. The phage was partially protective against a challenging dose of 10,000 M.L.D. when given simultaneously or up to seven days prior to infection. Heat-killed dysentery phage gave protection after 5-7 days, presumably as a result of an "immune-response", but showed no prophylactic action when given as long as five days preceding an infective dose of 10,000 M.L.D.

Tests to find out the reactivity of the phage within the group were carried out. Ignoring four strains not attacked by either the dysentery X-phage or the dysentery Y-phage, 68% of 460 strains of *Bact. flexneri* were attacked by both phages. Only two more *Bact. flexneri* strains were attacked by dysentery X-phage than by dysentery Y-phage, whereas two more *Bact. sonnei* strains were attacked by the Y-phage than by the X-phage.

The number of mice used in the experiment was rather small, results being based on units of three mice, and the tables show that the results were not uniform throughout.—R. M. LOOSMORE.

See also absts. 2015 (interference between viruses), 2181 (rinderpest), 2192 (rabbit myxoma), 2196 (bovine malignant catarrh in New York State), 1947 (bacteriophage).

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LENNETTE, E. H., & KOPROWSKI, H. (1946.) Interference between viruses in tissue culture.—*J. exp. Med.* 83, 195-219. [Authors' summary copied verbatim.] 2015

The influence of one virus on the growth of another in tissue culture was investigated.

The 17DD High strain of yellow fever virus was found capable of completely suppressing the growth of both the Asibi strain of the same virus and of the heterologous West Nile virus, even when these were added to the cultures in large amounts.

The 17DD High strain of yellow fever virus and the West Nile virus produced either partial or complete suppression of growth of the Venezuelan equine encephalomyelitis virus, depending upon the quantity of the latter inoculated into the cultures. Owing to lack of methods for the detection of interference except in a single direction, reciprocal interference with these viruses could not be investigated.

The 17DD High strain of yellow fever virus and the West Nile virus were able to suppress completely, or almost completely, the growth of influenza A virus added to the infected cultures in maximal amounts. Interference in the reverse direction, even with the use of small amounts of the neurotropic viruses, was not demonstrable.

Cultures infected with the 17DD High strain of yellow fever virus were examined for the presence of neutralizing antibodies and non-specific antiviral substances; neither was found present.

OLIVER-GONZÁLEZ, J., & MONTILLA, E. (1944.) Effect on blood agglutinins of a polysaccharide isolated from *Ascaris suum*.—*Proc. Soc. exp. Biol.* N.Y. 56, 169-171. 2016

Subsequent to the discovery that the polysaccharide fraction of *A. lumbricoides* var. *suum* absorbs the X and B agglutinins of human sera, the authors investigated

its effect on anti-Rh, anti-M, anti-N and cold agglutinins. Their results indicate that the polysaccharide has no absorptive effect on any but X and B agglutinins.

—J. F. A. SPRENT.

BOYD, W. C. (1946.) Effect of photo-oxidation on isohaemagglutinating antibodies.—*J. exp. Med.* 83. 221-225. [Author's summary copied *verbatim*.] 2017

Photo-oxidation (in the presence of eosin Y as a sensitizer) of isohaemagglutinating sera destroyed their agglutinating activity gradually but did not seem to convert any of the agglutinins studied into inhibiting ("incomplete" or "blocking") antibody.

RICHOU, R., & HOLSTEIN, G. (1940-41.) Le développement de l'antitoxine staphylococcique chez les animaux soumis aux injections d'anatoxine spécifique. [The development of the staphylococcal antitoxin in animals injected with a specific anatoxin.] —*Rev. Immunol.* 6. 363-380. 2018

A review is given of the effect of toxoid inoculation on the antitoxin level in the g. pig, rabbit, monkey, horse, bovine, sheep, dog and bird. Generally, a better response is obtained when natural antibody is already present in the animal and by a series of injections given at short rather than at long intervals. Experiments show that large amounts of antitoxin are produced in the rabbit, the monkey, the bovine, the horse and the sheep. In cows, while a good response is obtained in the serum, only slight amounts appear in the milk. An account of the therapeutic value of toxoid in the dog is given.—B. WEITZ.

HARMS, A. J. (1946.) Abnormal precipitation of proteins from antitoxic horse plasma in the presence of phenolic compounds. [Correspondence.]—*Nature, Lond.* 157. 514. 2019

The usual sequence of precipitation of the plasma proteins by ammonium sulphate was found to be altered in the presence of 2% phenol or 1% tricesol. The albumin was precipitated by low concentrations of ammonium sulphate, leaving the globulins still in solution.

See also absts. 1934 (TB. allergy), 2123 (snake venom antigens and antibodies), 2031 (ascaris antigen), 1996 (serum therapy of rinderpest), 1987 (vaccine antiserum from horses), 1941 (toxin of *Corynebact. pyogenes*), 1954 (bactericidal complex in blood), 1955-1960 (immunization against bovine brucellosis), 2001 (against fowl plague), 1944 (against swine erysipelas), 2192 (against bovine pleuro-pneumonia), 1998 (complement-fixation test with encephalitis viruses), 2169 (tumour treatment by bacterial toxins).

PARASITES IN RELATION TO DISEASE [GENERAL]

KUO, S. C., & KIANG, L. M. (1943.) The animal parasites of dogs in Chengtu.—*Chin. med. J.* (Chengtu Edit.) 62A. No. 1. 15-18. 2022

Among the ecto- and endoparasites of 40 dogs examined in Chengtu, the authors found ticks of the genera *Amblyomma* and *Haemaphysalis*. *Ancylostoma caninum* was the most frequently occurring nematode, being found in 36 of the dogs; it is suggested that the

See also absts. 2204 (textbook).

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

— (1943.) Recent advances in the prevention and treatment of blowfly strike in sheep. Supplement to report no. 2 by the Joint Blowfly Committee.—*Bull. Coun. sci. industr. Res. Aust.* No. 174. pp. 20. [For report no. 2, see *V. B.* 11. 694.] 2023

This bulletin recapitulates the substance of Report No. 2, and includes results of subsequent investigations.

Preventive measures are based on reduction or elimination of one or more of the predisposing causes of fly strike, i.e., inherent predisposition, immediate susceptibility, abundance of primary blowflies (*Lucilia*

H. used this observation as the basis for a method for concentrating antitoxic sera. By a single precipitation with ammonium sulphate it was possible to obtain a solution consisting almost completely of β and γ globulins. After a further precipitation and dialysis an antitoxic globulin solution was obtained which had certain advantages over the solutions prepared by the normal ammonium sulphate concentration methods.

The method was also used for concentrating antibacterial sera. The work is being continued.—R. R. A. C.

*TROISIER, J., SIFFERLEN, & MACLOUF, A. C. (1942.) Anergie tuberculinique sénile et phénomène de Baldwin-Gardner-Willis. [Senile tuberculin anergy and the Baldwin-Gardner-Willis phenomenon.]—*Pr. méd.* No. 44. pp. 609-610. [Abst. from abst. in *Bull. Inst. Pasteur.* 42. 75.] 2020

In g. pigs previously inoculated with tubercle bacilli of low virulence the loss of allergy is gradual. At one stage before hypersensitiveness has completely disappeared, reinfection is followed by a shortened pre-allergic lag (phenomenon of Willis). At a later stage this peculiarity is not observed. In only 20% of the aged, who do not react to tuberculin applied even in large concentrations, is the phenomenon of Willis seen after an injection of BCG. The authors presume that the other 80% must have been anergic for a long time.—M. L. LEVI.

PARFENTJEV, I. A., & GOODLINE, M. A. (1945.) Diphtherial toxoid purified by absorption.—*J. Bact.* 50. 661-666. [Authors' summary copied *verbatim*.] 2021

A process for the purification of diphtherial toxin by absorption is described. Conditions for the selective absorption of diphtherial toxin and toxoid with magnesium hydroxide, magnesium lactate, and calcium phosphate are outlined. Evidence is presented that diphtherial toxoid purified by the absorption method to such a degree that at least 90 per cent of the original nitrogen is removed still retains high antigenic properties.

larvae of this species may be involved in the severe hookworm dermatitis observed in growers of corn and sweet potatoes in Northern Szechwan. *Dirofilaria immitis*, *Diphylllobothrium mansonii*, *Echinococcus granulosus*, *Echinococcus perfoliatus*, *Paragonimus* sp., and *Metagonimus yokogawai* were all found, but *Clonorchis sinensis*, which is very common in dogs in Canton, was not found.—J. F. A. SPRENT.

cuprina, *Calliphora* spp.). Methods of reducing inherent predisposition are dealt with in some detail and include selection at breeding of less predisposed types of sheep, removal of excess of loose skin from the breech area (Mules' operation) for the control of crutch strike, and docking the tail at an optimal length, which is longer than that commonly in vogue.

Observations on breeding towards plainness of the breech [the non-wrinkly, A type sheep of SEDDON *et al.*—*V. B.* 3. 141] show that the mere selection and use of plain-breeched parents will not be sufficient to

obtain a high percentage of A type sheep, and that the use of progeny-tested rams will be necessary. Figures are given which indicate that the progeny of plain-breeched rams from plain-breeched ewes which themselves were from plain-breeched parents, did not produce a greater percentage of plain-breeched sheep than did the first generation.

The Mules operation for removal of breech wrinkles and stretching of the bare, non-woolled area surrounding the vulva, has been modified in various ways. The modified operation is fully described and illustrated in a series of photographs. It has been shown in field trials that sheep treated with the modified Mules operation are less predisposed to crutch strike than are naturally plain-breeched, A type sheep. Figures for the incidence of blowfly strike in treated and untreated sheep provide ample support for the general application of this method of reducing inherent predisposition. Only 120 strikes were recorded in a 12-month period among 10,000 young treated ewes, i.e., 1.2%, while in 8,000 aged untreated ewes in the same flock there were 10,800 strikes, i.e., 135%.

Docking of the tail at a somewhat greater length than usual provides a further reduction in the inherent predisposition to strike. The recommendation is to dock the tail at a level which will bring the tip about $\frac{1}{2}$ in. below the tip of the vulva. For the treatment of strike, the dressings known as B.T.B. and B.K.B. are described.

Reduction in the abundance of the primary sheep blowfly, *Lucilia cuprina*, will assist in reducing the incidence of strike. Fly abundance can be reduced by preventing the breeding of flies in strikes on live sheep, that is by the removal of predisposition and susceptibility in sheep, and the early treatment of strikes with a dressing that kills the maggots. The present trapping methods have little value in reducing the incidence of strike. Although carcasses are not very suitable breeding places for *L. cuprina*, it is suggested that efficient disposal of carcasses should receive attention on sanitary grounds.—H. McL. GORDON.

DE KOCK, G. (1945.) Tick infestation as an aetiological factor in diseases of unknown origin among cattle.

—*J. S. Afr. vet. med. Ass.* 16, 65-69. 2024

Experiments were carried out in which cattle exposed to a minimal tick infestation in one district See also absts. 1963 (sheep blowfly), 2192 (ectoparasites in Australia), 1980 (cattle ticks), 1991 (vector of Western E.E.), 1993 (of blue tongue and African horse sickness), 2011 (of rickettsial conjunctivitis), 2026 (of anoplocephalid cestodes).

PARASITES IN RELATION TO DISEASE [HELMINTHS].

SOLDATOVA, A. P. (1945.) A contribution to the study of the biology of *Oribateid* mites, intermediate hosts of cestodes of the family *Anoplocephalidae*.—*C. R. Acad. Sci. URSS.* 46, 343-344. [In English.] [Abst. in *Rev. appl. Ent.* Ser. B. 33, 165, copied verbatim.] 2026

The duration of adult life of the *Oribateid* mites that are intermediate hosts of various *Anoplocephaline* Cestodes is a question of particular importance, as the mites become infested with eggs of the tapeworms after they reach the adult stage. Laboratory observations were therefore carried out in Russia in which freshly moulted adults of *Scheloribates laevigatus*, Koch, *S. latipes*, Koch, and *Galumna obvisus*, Berl., were kept in boxes containing decayed leaves, moss and rotten wood and were examined and transferred to fresh boxes at intervals of 10-15 days and more frequently after the first dead mites were found. The shortest and longest periods of life were 15 months 6 days and 15 months 17 days for *S. laevigatus*, 14 months 27 days and 15 months 27 days for *S. latipes*, and 13 months and 15 months 6 days for *G. obvisus*. Since the various Cestodes

were sent to other districts where ticks were numerous. Fever reactions often developed and in many cases Koch's blue bodies were observed in lymph node smears. The appearance of the blue bodies was thought to be due to an exacerbation of an existing *Theileria mutans* infection resulting from a superimposed infection with a "toxin" or "virus" from the tick. Recovered cases were susceptible to East Coast fever. The theory is propounded that certain ticks may be capable of producing disease in cattle, with febrile reactions and in some cases death, this disease being quite apart from such conditions as piroplasmosis, anaplasmosis, heartwater and theileriasis. The author stresses the importance of complications which may arise in experiments on theileriasis from the disease-producing factor in the tick, "virus" or "toxin" as it may be. Suggestions are made as to the lines on which investigation of the condition should be conducted.—E. M. ROBINSON.

GUILHON, J., & BOULLAUD, M. (1944.) Sur une épizootie de gale sarcoptique du bœuf. [An epizootic of sarcoptic mange in cattle.]—*Rec. Méd. vét.* 120, 145-151. 2025

Previous to the publication of the present account of an outbreak in Vendée, this disease has been considered rare and of an unimportant, benign and transient nature in bovines in France. The clinical characters of the many cases in Vendée, which frequently ended in death, correspond closely to the picture presented in bovine scabies in Great Britain. The origin of the outbreak was traced to the introduction of two young bulls from an infected farm in Nièvre. From the finding of horses infected with sarcoptic scabies on the same farm the authors conclude, without attempting reciprocal transference of the parasites between cattle and horses and other animals and without morphological examination of the mites, that the epizootic was of equine origin. They suggest that the infestation was introduced by German horses stabled at the farm at Nièvre.

The animals were well fed but this did not modify the course of the disease, although cattle turned out to graze fared better and some recovered spontaneously. Treatment with 60% sodium sulphite solution followed after two hours with 10% hydrochloric acid, repeated once after the animal had dried, gave clinical cure.

—TOM SPENCE.

reach the infective stage in the mites within periods of up to 5 months 20 days, the mites may remain infective for 9-10 months.

When the mites were bred individually from egg to adult at 18-23°C. [64.4-73.4°F.], the immature stages lasted 97 days for *S. laevigatus*, 84 for *S. latipes*, and 109 for *G. obvisus*.

SPRENT, J. F. A. (1946.) Some observations on the incidence of bovine helminths in Plateau Province, Northern Nigeria.—*Vet. J.* 102, 36-40. 2027

In an examination of the worm burden of 250 zebu cattle, 15 species of nematodes, four species of trematodes and five species of cestodes were found to be present. *Haemonchus contortus*, *Cooperia* spp., *Trichostrongylus* spp., *Bunostomum phlebotomum* and *Oesophagostomum radiatum* were the five most common species of nematodes, but the numbers present were rather small. A single specimen of *Fasciola gigantica* was present in the livers of nearly all the animals, and small numbers of *Dicrocoelium hospes* were usually present. One animal carried *Schistosoma bovis* and

about 50% carried *Cotylophoron cotylophorum*. 15% of the animals harboured at least one tapeworm. No lesions except the bite-marks of *Bunostomum phlebotomum* in the upper duodenum were found in yearling zebu cattle, but in calves heavy ascariis infestations were often seen and in two cases such infestation was the cause of blockage of the intestine and was associated with intussusception.

Haemoglobin estimations were carried out by Sahli's method, the values found ranging from 50–120% and being lower in the rainy season (May to September) than in the dry season. The anaemia appeared to bear no relationship to worm infestation and it is suggested that chronic reinfection with tick-borne protozoa might be the cause. It is pointed out that cattle on the Veterinary Stock Farm, Vom, Northern Nigeria, carry a much greater helminth burden than do the nomadic cattle, and that there is a danger of an increased incidence of worm disease if the pasture range of nomadic cattle is cut down.—T. E. GIBSON.

LUCKER, J. T., & NEUMAYER, E. M. (1946.) Experiments on the pathogenicity of hookworm (*Bunostomum trigonocephalum*) infections in lambs fed an adequate diet.—*Amer. J. vet. Res.* 7. 101–122. 2028

These experiments showed conclusively that 1,500–2,000 specimens of *B. trigonocephalum* were capable of causing retardation of growth and non-fatal normocytic, slightly hypochromic anaemia in artificially infected lambs which were well fed and cared for. Blood was detected in the faeces 3–4 weeks after initial infection, and evidence of anaemia appeared at about the same time, suggesting that anaemia results from loss of blood caused by the activities of the parasites in the intestine. The work is important because it gives, for the first time, reliable information that the hookworms of ruminants are capable of producing anaemia. Clinical experience has indicated that fewer than 500 of these parasites can be harmful but this is not confirmed by these experiments. As the authors point out, however, defective nutrition is likely to be an important predisposing factor in the genesis of anaemia in natural infestation and where nutrition is poor, relatively few worms may be harmful.—J. F. A. SPRENT.

*ALBERTI, A. (1941.) Broncopolmonite verminosa delle pecore. [Verminous broncho-pneumonia of the sheep].—*Riv. Zootech.* 19. June-July. [Abst. from abst. in *Berl. Münch. tierärztl. Wschr.* [Wien. tierärztl. Mschr. August 20th. 285. (1943).] 2029

Studies were made of the prepatent period and the life-cycle of the sheep lungworm, *Dictyocaulus filaria*. For the treatment of lungworm disease, an iodine-glycerin solution in distilled water is recommended. The solution is given by intratracheal injection performed during an inspiration after the animal has been held secure for at least $\frac{1}{2}$ min.—T. E. GIBSON.

REID, W. M. (1945.) The relationship between glycogen depletion in the nematode *Ascaridia galli* (Schränk) and elimination of the parasite by the host.—*Amer. J. Hyg.* 41. 150–165. 2030

Week-old chicks were parasitized with infective eggs of *A. galli*; 8–9 weeks later when the worms were mature, the fowls were divided at random into three groups. Birds of the first group were killed without any preliminary starvation, of the second group after 24 hours' and of the third group after 48 hours' starvation. In each case the worms were recovered, sorted into sexes and analysed for glycogen content. 71% of the glycogen content of female worms was lost in the

first 24 hours and a further 18% in the second 24 hours of starvation of the host. Similar figures were obtained for male worms, although it was noted that these had a significantly lower glycogen content than female worms, both before and after starvation. No worms were expelled by the fowls after 24 hours' starvation and only a few after 48 hours'. In a second experiment fowls were subjected to periods of 48 and 96 hours' starvation. Ten out of 14 fowls starved for 96 hours eliminated all their nematodes and the glycogen reserve of the few worms remaining in the other four fowls was reduced by 95% as compared with that of the controls.

It is concluded that the elimination of *A. galli* from the host following a period of starvation is dependent upon the depletion of the glycogen reserve.—D. G. G. BRUNNER, M., ALTMAN, I., & BOWMAN, K. (1944.) Canine sensitivity to ascaris antigen.—*J. Allergy.* 15. 2–8. 2031

Following a report of a case in a dog of allergic hypersensitivity resembling human hay fever, the authors conducted experiments to test whether the dog is subject to ascaris hypersensitivity. Antigens prepared from ascarid worms from dogs and pigs were injected intradermally into 24 dogs. The 12 reactions obtained were correlated with the presence of ascarid eggs in the faeces, but no striking relationship was shown. In two of these dogs general anaphylactic symptoms resulted from the test.

Successful attempts were made to transfer this skin sensitivity to non-sensitive dogs and human beings by means of the serum of sensitive dogs, and also to sensitize dogs actively by subcutaneous administration of ascaris antigen.

It was found that the skin-sensitizing antibodies in the serum of hypersensitive dogs were rendered inactive by exposure to a temperature of 56°C. for 30 min.

—J. F. A. SPRENT.
WARREN, V. G., WARREN, J., & HUNTER, G. W., III. (1946.) Studies on filariasis. I. Serological relationship between antigenic extracts of *Wuchereria bancrofti* and *Dirofilaria immitis*.—*Amer. J. Hyg.* 43. 164–170. [Authors' summary copied verbatim.] 2032

Antigens were prepared from microfilariae of *W. bancrofti* and from adult *D. immitis*. Utilizing these antigens, complement-fixation tests were performed on a series of human sera from patients diagnosed clinically as having filariasis. It was found that these sera would not fix complement in the presence of the *W. bancrofti* antigen, even though motile microfilariae were present in the sera; however positive fixation did occur when the *D. immitis* antigen was employed. On the basis of these findings it appears that the *W. bancrofti* antigen described above is unsuitable for use in a complement-fixation test for the diagnosis of human filariasis.

Intradermal tests were performed on 32 patients with clinical filariasis. The results indicated that the *W. bancrofti* antigen is probably at least as reliable as that of *D. immitis* as a skin testing antigen. Further work is indicated to determine whether the former is not, or cannot be rendered, the more specific in this test.

Specific hyperimmune sera were produced in rabbits by prolonged immunization with suspensions of microfilariae of *W. bancrofti* and adult *D. immitis*. By means of complement fixation and complement absorption techniques utilizing these hyperimmune animal sera, it was shown that a group-specific and a species-specific antigenic factor are present in both these filarial worms.

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

VON JENEY, A., & VON KORPÁSSY, B. (1944.) Ueber eine tumorartige Spontanerkrankung der pericoecalen Lymphknoten bei weissen Ratten. [A spontaneous tumour-like lesion of the pericaecal lymph nodes.]—*Schweiz. Z. Path. Bakt.* 7. 55–63. [English, French and Italian summaries.] [Authors' English summary slightly amended.] 2033

Tumour-like lymph nodes in the pericaecal region of rats are described. The enlargement was due to lymphoid hyperplasia, dilation of the sinuses and cyst formation. Within the broadened narrow strands, proliferated reticulum cells, numerous plasma cells, eosinophilic leucocytes and macrophages were observed. These changes were due to a primary typhlitis leading to stasis within the regional lymphatics. These changes are of importance in interpreting the significance of lesions which are observed after the application of carcinogenic substances.

HENSHAW, P. S. (1945.) Implications from studies with physical carcinogens.—*J. nat. Cancer Inst.* 5. 419–436. 2034

Cancer can be caused by a number of physical agents including mechanical irritation, heat, sunlight, ultraviolet light, and ionizing radiations (X-rays, neutrons, α -particles, etc.). H. considers that cancer may be a form of accessory or tangential differentiation which may occur spontaneously or be induced by a variety of types of stimuli.—E. BOYLAND. 2037

DUNNING, W. F., & CURTIS, M. R. (1945.) The experimental production of extraskelatal bone-forming neoplasms in the rat.—*Radiology*. 44. 64–76. [Abst. in *Biol. Abstr.* Sect. F. 19. No. 7. 14, slightly amended. Signed: F. P. ELLINGER.] 2035

Of 7,500 neoplasms induced in the rat's liver by *Cysticercus fasciolaris*, 49 were bone-forming tumours. These rare bone-forming tumours were fortuitously distributed in the several lobes of the liver in five different inbred strains of rats and varied, like the non bone-forming neoplasms of the series, from benign to highly malignant growths. The hosts had from 1–64 parasitic cysts and the latent period was extremely variable. 66 bone-forming neoplasms were observed in a series of 2,351 tumours induced in rats by the subcutaneous injection of paraffin containing 3:4 benzpyrene; they were found in rats of both sexes of seven inbred strains. The bone-forming tumours were induced by concentrations of 1.0, 0.25 and 0.1% benzpyrene, which produced 1, 7 and 20% of the tumours respectively. The concentration of the incitant affected the rate of growth and malignancy of the induced neoplasms. Thus, tumours induced by 1% benzpyrene had a shorter latent period and a greater average daily increase in diameter and killed the host in a shorter average time after observation than tumours which were induced by weaker concentrations of benzpyrene. The bone-forming neoplasms induced by 1% benzpyrene had a longer average latent period, a longer average period from the time of observation to death and a smaller average daily increase in diameter than usual in the series. The heteroplastic bone-forming neoplasms were incited best by 0.1% benzpyrene in paraffin.

BIELSCHOWSKY, F., & GREEN, H. N. (1945.) An induced carcinoma in the fowl. [Correspondence.]—*Nature, Lond.* 156. 780. 2036

Carcinogenic agents, viruses and radium usually induce sarcomas or leucaemias in fowls. A case of

carcinoma following treatment with 2-acetylaminofluorene is recorded.

Five Rhode Island Red cocks received 2-acetylaminofluorene in food for 45 weeks, the daily dose commencing at 3 mg. and gradually increasing to 30 mg. (total 5.5 g.). Three fowls died in the first year with no evidence of tumour formation. The remaining two appeared healthy for 80 weeks and then began to lose weight; they were moribund in the 87th week, i.e., 41 weeks after the drug was withdrawn. One died as the result of leucaemia, involving the liver and spleen, with relatively few immature leucocytes in the blood. It was impossible to decide whether this was a spontaneous case of leucaemia or whether it was due to the action of the drug.

The kidneys of the remaining fowl were converted into irregular masses by the formation of whitish-yellow, rather tough nodules. Histologically they were seen to be composed of polyhedral epithelial cells. The condition had the characters of anaplastic carcinoma. Since such a tumour is not known to arise spontaneously, the authors attributed its development to the action of 2-acetylaminofluorene.—F. D. ASPLIN. 2037

REINHARD, M. C., GOLTZ, H. L., & WARNER, S. G. (1945.) Further studies on the quantitative determination of the growth of a transplantable mouse adenocarcinoma.—*Cancer Res.* 5. 102–106. [Authors' conclusions copied *verbatim*.] 2037

From the information presented it can be concluded that the rate of growth of the Marsh-Simpson tumor is independent of the number or volume of viable cells inoculated; and that the only effects of decreased numbers of inoculated viable cells are (a) an increased latent period, (b) a decrease in the percentage of animals that grow the tumor.

MILLER, E. W., & PYBUS, F. C. (1945.) The inheritance of cancer in mice. With special reference to mammary carcinoma.—*Cancer Res.* 5. 84–93. [Authors' summary copied *verbatim*.] 2038

The incidence of mammary carcinoma was investigated in a series of crosses and backcrosses between Simpson (high tumor) and Edinburgh (low tumor), and Simpson and CBA (low tumor) strains of mice. The results confirm the existence of a maternal extrachromosomal factor for mammary carcinoma discovered by previous workers, and also show that an important part is played by interstrain genetical differences in susceptibility.

No extrachromosomal factor was observed in the inheritance of lung tumors, hepatomas, or bone tumors, while the evidence was inconclusive in the case of lymphadenopathy.

MILLER, E. W., & PYBUS, F. C. (1945.) The effect of foster nursing on the incidence of spontaneous mammary carcinoma in two inbred strains of mice.—*Cancer Res.* 5. 94–101. [Authors' summary copied *verbatim*.] 2039

When females of the Simpson (high mammary tumor) strain were fostered by mice of Strong's CBA (low mammary tumor) strain, the incidence was reduced from 69.5 per cent (average age = 14.5 months) to 55 per cent (average age = 12.4 months). There was unavoidable delay in fostering some of the litters, and even some of those fostered within 24 hours after birth had probably been suckled by their own mothers. There were fewer mammary tumors in the offspring of the fostered Simpson mice, partly because of a greatly increased mortality from lymphadenopathy. The off-

spring of fostered tumorous females, had a higher tumor incidence than the young of fostered nontumorous mice.

The mammary tumor incidence in CBA females fostered by Simpson mice was raised from 5 per cent (average age = 27.8 months) to an average of 44.4 per cent (average age = 20.3 months) in all those dying over the age of 6 months, and to 77.8 per cent in those fostered within 24 hours and dying over the age of 10.5 months.

The CBA fostered females were able to absorb the milk influence and transmit it to their offspring even when they themselves died nontumorous; tumors appeared in the young of nontumorous as well as of tumorous fostered females.

There was a very great increase in lymphadenopathy in fostered Simpson mice and their offspring; there was also a definite smaller increase in the disease in fostered CBA mice and their descendants.

Fostering had no effect on the incidence either of lung adenomas or of hepatomas, except in so far as mice developed mammary carcinomas before reaching the normal lung or liver tumor age.

When young CBA mice had spent from 6 to 12 days with their own mothers before being fostered to Simpson females, they were no longer susceptible to the action of the milk influence, although they were able to transmit it to their young. Possible reasons for this are discussed.

BALL, R. F. (1946.) A histopathological study of

See also absts. 2168 (treatment of leucaemia), 2169 (of malignant tumours by bacterial toxins), 2192 (rabbit myxoma).

DISEASES, GENERAL

HUEPER, W. C. (1944-1945.) Arteriosclerosis.—*Arch. Path.* 38. 162-181, 245-285 & 350-364; 39. 51-65, 117-131 & 187-216. 2041

In this review of the bearing of clinical and experimental findings on the problem of the aetiology of arteriosclerosis, H. discusses at length the view that although the condition may be due to many causes, endogenous as well as exogenous, these all act fundamentally by interfering with the oxidative metabolism and nutrition of the vascular wall. The possible aetiological factors are considered to fall into four groups.

In the first group, related to vasotonia, there may be hypotonia, leading to local anoxaemia or hypoxaemia and impaired nutrition from stagnation of the blood flow, or hypertonia, with ischaemic anoxaemia arising from compression of the vasa vasorum by the contracting media and from reduction of the local diffusion processes. The ensuing damage to the vascular tissues, and especially to the endothelium, leads finally to increased permeability with subsequent infiltration by constituents of the plasma.

In the second group, intravascular hydrostatic pressure may be decreased locally or generally as a result of physiological or pathological factors, or, on the other hand, local anoxaemic processes may arise from local or general increase of hydrostatic pressure interfering with the blood flow in the vasa vasorum by the mechanical over-extension of the contractile elements of the vessel wall or by compression of the vasa vasorum against the inelastic adventitia.

The third group of factors causes an impairment of the exchange of gases and other nutritive material through the interface between the blood and the vascular wall by the interposition of a film or precipitate formed by a substance deposited as a result of instability

depigmented irises from Single Comb White Leghorns.—*Cornell Vet.* 36. 31-40. [Author's summary copied verbatim.] 2040

A histopathological study of depigmented and normal, reddish bay irises from Single Comb White Leghorns is presented. Fifty-five to 76 per cent of the various groups of depigmented irises from Leghorns which died between 160 and 500 days of age were infiltrated with lymphocytes. Twenty-seven per cent of the normal reddish bay irises from similar birds were also infiltrated.

A large proportion (77 to 100 per cent) of both faded and reddish bay irises from apparently healthy, 500-day-old Leghorns were found to have accumulations of lymphocytes. The lymphocytic infiltrations which were observed in these irises were indistinguishable from the lesions of ocular lymphomatosis. The apparent abnormality of these cellular infiltrations was demonstrated by the fact that no such lesions were found in the irises of (1) day-old Leghorn chicks, (2) 300-day-old lymphomatosis-free Leghorns and (3) 8 to 10 months old turkeys.

Lymphocytic infiltrations (typical of ocular lymphomatosis) were found in 8 of 11 irises from four month old ducks. The significance of these lesions in the irises of ducks, a species which possesses a high degree of natural resistance to all forms of lymphomatosis, is discussed.

The reliability of iris color as a criterion in the selection of laying and breeding stock is questioned as a result of these studies.

of the plasma colloids. This instability may be brought about by a derangement of the relations of the normal colloids, by the appearance of abnormal endogenous colloids in the plasma, or by the introduction of exogenous colloids into the blood. After injuring the endothelial lining, these agents penetrate with the plasma into the intima and finally into the media of the blood vessel and are deposited in the interstices or incorporated into the cytoplasm of cells. In this connexion particular reference is made to cholesterol.

In the fourth group, the anoxaemia is of haematogenous origin and due either to agents producing inert haemoglobin derivatives or to agents causing a disturbance in the O_2 : CO_2 balance.

These groups of possible aetiological factors are fully discussed: the original article should be consulted for details. There are numerous references.—E. C.

DARRASPEN, E., FLORIO, R., & SENTENAC, P. (1943.) Formol-séro-gélification et troubles hépato-rénaux chez le chien, le cheval et le boeuf. [The formol-gel test in hepatic and renal affections in the dog, horse and ox.]—*C. R. Soc. Biol. Paris.* 137. 506-507. 2042

In order to test the theory that the formation of a formol gel is due to a disturbance of the equilibrium of the blood proteins caused essentially by dysfunction of the hepato-renal system, formol-gel tests were carried out on a series of animals in which the functioning of the hepato-renal system was gauged by analyses of the blood and urine. In 18 animals with chronic diseases not involving the liver and kidneys the test was uniformly negative. Out of 18 animals with primary hepato-renal insufficiency, 15 gave positive formol-gel readings. In 27 animals with chronic diseases involving the liver and kidneys tests were uniformly positive.

It is considered that these results confirm that the test depends on hepato-renal dysfunction and cannot be considered specific, but that in certain cases such as leishmaniasis and equine infectious anaemia, it can be used to corroborate clinical evidence.—U. F. R.

*FEKETE, F. (1944.) [Urinary calculi in the horse. Operative removal of seven stones from the ureter.]—*Allatorv. Lapok.* p. 7. [Abst. from abst. in *Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* 52/50. 295.] 2043
A stone weighing 200 g. was removed manually from the urinary bladder of a mare 15-16 years old with a history of recurrent symptoms of colic for one and a half years. Seven calculi were removed from the ureter after a new attack of colic: one hand was introduced through the dilated urethra and the other through the vagina and the calculi were grasped by means of caponizing forceps.—J. ZWEIF.

SJOLTE, I. P. (1944.) Polyneuritis equi. [Polyneuritis equi.]—*Maanedsskr. Dyrlæger.* 56. 357-413. 2044
In some cases of apparent neuritis and perineuritis of the cauda equina of the horse, the so-called "Hammelschwanz", symptoms were observed outside the region of the cauda equina, and occasionally in the cerebral nerves.

Investigation of nine cases of the disease showed that it must be regarded as a polyneuritis, with inflammation of nerves over a larger area than hitherto supposed. The condition begins as a serous inflammation, followed later by circulatory disturbances, hyperaemia and haemorrhage, together with fibrin exudation. Later reparative processes begin with pronounced new tissue formation leading to marked induration. Collaterally with this, there are changes in the medullary sheaths leading to total degeneration of the nerve fibres.

—R. PETER JONES.

HARTROFT, W. S. (1945.) The microscopic diagnosis of pulmonary emphysema.—*Amer. J. Path.* 21. 889-903. 2045

Rupture of alveolae in uncomplicated emphysema is rare. The following features are considered diagnostic of emphysema in the human lung: (a) a decrease in alveolar depth with (b) an increase in alveolar diameter and (c) flattening of the base of the alveolae. If alveolae rupture, the case ceases to be uncomplicated for sub-pleural "blebs" are seen and pneumothorax or pulmonary interstitial emphysema may occur.—A. T. P.

PALLASKE, G. (1944.) Ueber puerperale Erkrankungen des Rindes. [Puerperal diseases of cows.]—*Berl. Münch. tierärztl. Wschr./Wien. tierärztl. Mschr.* Jan. 21st. 33-34 & Feb. 4th. 39-41. 2046

P. gives a description, mainly pathological, of the prevailing forms of puerperal disease in cattle in Wartheland.

Retention of the foetal membranes became more prominent during the war when veterinary practitioners were scarce: when untreated it leads to septic metritis and general toxæmia. The lesions are described. Necrotic metritis caused by the necrosis bacillus is often seen, particularly on farms where footrot of like causation was established.

A third puerperal disease, not widely recognized, is fatty degeneration of the liver, called liver coma and "Festliegen". A few days after a normal calving the cow suddenly loses appetite and stops ruminating and lactation ceases. The cow remains down, with rapid breathing and pulse and passes into a coma before death. There is no icterus or red water as in puerperal haemoglobinuria. The chief finding P.M. is a swollen, bright yellow, fatty liver. The kidneys are also pale and swollen. P. believes that a similar disease occurs

in swine and sheep and that it is a metabolic disorder.—J. E.

I. KLEVAR. (1943.) Offisielle Bekjætgjærelser Fra Veterinaerdirektøren. Bekjemp klauvsjuken hos sau. [Norway: official notice from the Veterinary Director: control of foot-rot in sheep.]—*Norsk VetTidsskr.* 55. 258. 2047

II. HAGELIN. (1943.) Fra Innenriktsdepartementet. Veterinaeravdelingen. Rundskriv nr. 46, 1943. Forskrifter og instruks for kampen mot smittsom klauvsjuke hos sau. [Norway: regulations for the control of foot-rot in sheep.]—*Ibid.* 259-260. 2048

I. This is a notice for farmers, drawing attention to the need for control of foot-rot, which has recently been spreading in Norway and a description of which is given. All cases are to be reported and dealt with in accordance with II.

II. This is the text of the regulations dated May 18th, 1943, for the control of foot-rot by veterinarians. Control is based on the principle of segregation of affected sheep by their removal from common pasture, and confinement at certain premises or on dry home pasture where they can be kept under observation and created by orthodox methods. Disinfection of premises is also ordered, this being carried out as required both during the period of treatment of the infected animals and after cure, when the flock is allowed out to pasture again.

Supervision throughout is by the District Veterinarian, acting on behalf of the Veterinary Director and in co-operation with practitioners.

Before a treated flock is released for open pasture one winter must have passed without a fresh outbreak. Pasture on which cases of foot rot have occurred may not be used by sheep for a period of three months.—J. E.

LINDEMANN. (1943.) Ist Vitamin A-Mangel die Ursache des Herzodes bei Schweinen? [Is vitamin A deficiency the cause of fatal syncope in swine?]—*Berl. Münch. tierärztl. Wschr./Wien. tierärztl. Mschr.* Oct. 1st. 341. 2049

According to L., fatal syncope appearing in swine, mostly in the spring, is due to a nutritional deficiency. The pathological changes in the thyroid resembled those found in hyperthyroidism, in which the administration of vitamin A is reputed to have beneficial results. Though the symptoms of vitamin A deficiency in swine were different from those of death by heart failure, it was assumed that death occurred before the characteristic symptoms could appear. The diet of the animals, deficient in vitamin A, consisted mainly of skimmed milk, potatoes and beetroot. The rare occurrence of syncope in Western Germany could be explained by the greater use of cod liver oil and fish meals. L. suggests as a preventive measure the inclusion of large amounts of green vegetables in the rations for pigs.—E. KODICEK.

NAIRN, W. (1945.) Some clinical notes—with special reference to the digestive system of the ox.—*Vet. Rec.* 57. 481-482. Discussion p. 482. 2050

Four conditions are described and the symptomatology is given. Actinobacillosis of the reticulum, common in bullocks 2-4 years old, is characterized by an erratic appetite and failure to increase in weight: in some cases the liver may be infected. A second condition occasionally encountered is characterized by anorexia and constipation. The abdomen is distended and the rumen is full of evil-smelling fluid. Medicinal treatment is useless and rumenotomy is recommended

as the most rational treatment to remove the excess fluid. It is suggested that the condition is due to failure of the pylorus combined with excess pressure, inhibiting peristalsis. The third and fourth conditions are hepatitis due to infection with *Fusiformis necrophorus* and to chronic ragwort poisoning. In the first case recovery may occur but the reason for an acute flare-up of the condition is obscure; in the second case there may be no symptoms until an acute condition occurs after animals have been fed on hay containing ragwort for two years or more. Then they have pain, diarrhoea, elevated temperature and a pendulous abdomen.

—A. T. PHILLIPSON.

KORKMAN, N. (1940.) Om förekomsten av vattensotkalvar hos ayrshireboskopen i Finland. [On the occurrence of dropsy in Ayrshire cattle in Finland.] —*Nord. Jordbr.Forskn.* 22. 225-243. 2051

This defect consisted of generalized anasarca and ascites in newborn calves, which died soon after birth. The trouble was traced to a bull which on mating with

his sisters and daughters produced a proportion of affected calves.

The genetical features are described fully.—J. E. NIELSEN, J. (1942.) Undersøgelser over Forekomsten av arvelig Lambed inden for R.D.M. [Investigations on hereditary lameness in Red Danish cattle.]—*Nord. Jordbr.Forskn.* 24. 97-100. 2052

This inherited lethal factor in the Red Danish dairy breed of cattle consists of complete inability to stand. Calves are born with the disability and lie on their sides with limbs stretched out and often with flexed fetlock joints. Otherwise they are normal, but after 2-3 weeks the effect of decubitus runs its lethal course. No affected calf survives.

The defect is known in a number of places in Denmark and has been verified in 249 calves, the progeny of 39 bulls and 213 cows. The first cases appeared in 1924 and their number increased progressively up to 56 in 1941.

The genetical nature of the defect was worked out and is described.—J. E.

See also absts. 1997 (respiratory diseases of cattle), 2166 (of horses), 2081 (congenital goitre in lambs), 2164 (metritis), 2170, 2171 (shock), 2192 (livestock diseases in Australia), 2195, 2196 (in New York State), 2197 (in Algeria), 2198 (in the Belgian Congo).

NUTRITIONAL AND

METABOLIC DISORDERS

GWATKIN, R. (1945.) Mortality in young pigs. I. Effect of diet from birth to weaning and from weaning to maturity.—*Canad. J. comp. Med.* 9. 263-281. 2053

G. studied the effect of the sow's diet on young pigs dependent on her milk as the only and later as the major source of nourishment. Ten gilts were paired and fed five different diets; all had been housed since birth. They were bred and eight conceived. The diets ranged from grain and NaCl only, to grain, CaCO₃, NaCl, tankage (food of high protein value obtained from animal offal which has been cooked, dried and compressed), feeding oil and FeSO₄.

The average weight gains per piglet per day, from birth to weaning, from weaning to the end of the experiment, and for the whole duration of the experiment were lowest in the group receiving grain and NaCl. They were 0.20 lb., 0.39 lb. and 0.13 lb. respectively. The average weight gains per piglet per day for the same periods were highest in the group receiving grain, NaCl, CaCO₃, tankage and oil. They were 0.42 lb., 1.0 lb., 0.84 lb. respectively. The results of weight gains and survival rates of the young suggest that more sows could have been used with advantage in the tests.

The survival rates varied, the highest being in the two litters in the group which received grain, NaCl, CaCO₃, tankage, oil and FeSO₄. In the group which received grain and NaCl one sow had six piglets which survived to the end and the other sow on the same diet had lost all her litter shortly after weaning time. The lowest survival rate was in the group fed grain, NaCl, CaCO₃ and tankage. The losses at weaning time were 44%, 56.5% and 12.5% for groups which received grain; grain and tankage; grain, tankage and oil, respectively. The losses after weaning were 4%, 23.7% and 8.3% for the same groups, respectively. From these results G. concludes that the effect of the sow's diet on the young was greater than the effect of the same diet on the young after weaning. The need of a complete diet for the sow is emphasized.—P. J. G. P.

NYFFENEGGER, A. (1945.) Älteres und Neues über den Mineralstoffhaushalt. [Old and new information concerning minerals.]—*Schweiz. Arch. Tierheilk.* 87. 205-210. 2054

Pica, occurring enzootically, mainly in summer and autumn, when green food was available, seemed to be due to a lack in the diet of calcium, phosphorus, magnesium and sodium and to an increased concentration of potassium and nitrogen. The imbalance was thought to be caused by excessive manuring. Analysis of the hay in regions where pica occurred confirmed the deficiency of the above-mentioned minerals.—E. K.

FERREIRA, E. A. (1941.) Os sais minerais na alimentação animal. [Mineral salts in animal nutrition.] —*Bol. Soc. Brasil. Agron.* 4. No. 2. Reprint pp. 28. 2055

This article discusses the importance of salts in nutrition of animals and birds, the consequences of deficiency of salts, and the preventive measures which may be taken to eradicate the related deficiency diseases. Formulae are given for the mineral mixtures which are recommended for the various deficiencies.

—I. W. JENNINGS.

*BOTTO, A. (1942.) Consideraciones acerca del complejo mineral en los forrajes. [Considerations on the mineral constituents of forage.]—*Rev. As. argent. Criad. Shorthorn.* 3. No. 14. 9, 16, 27 & 28. [Abst. from abst. in *Biol. Abstr.* Sect. F. 19. No. 7. 22. Signed: CARLOS PIAZZO.] 2056

B. stresses the importance of some of the problems of animal nutrition in Argentina, a country which has 43,307,000 and 52,496,000 head respectively of larger and smaller stock. Argentine pastures are deficient in Ca, P, etc. Analyses of 35 years ago proved that there was a soil deficiency of phosphates, and the continued growth of cereals and pasturage for animals (both exported products) have depleted the mineral content of the soil still more.

1,800,000 hectares more of alfalfa should be grown and it is proposed to take immediate steps such as the prohibition of the export of bones and other phosphate materials. Stock keepers should unite in the foundation of an institute to study animal nutrition.

BENNETTS, H. W., & BECK, A. B. (1942.) Enzootic ataxia and copper deficiency of sheep in Western Australia.—*Bull. Coun. Sci. industr. Res. Aust.* No. 147, pp. 52. 2057

This copper deficiency syndrome occurs in unweaned lambs and is characterized by low liver and blood copper levels in both lambs and ewes, by severe anaemia of the ewe near parturition and by demyelination of the nervous system. A low copper status is evident in the pasture of affected areas, where other syndromes of copper deficiency are found in plants and animals. The condition is prevented by administration to ewes of copper supplements either in the form of a lick or as a top dressing.—D. C. BLOOD.

BENNETTS, H. W. (1942). "Stringy" wool and copper deficiency in Western Australia.—*J. Dep. Agric. W. Aust.* 19. 7-13. 2058

"Stringy" wool, first described by B. in 1932, is a valuable index of copper deficiency, and is apparently the earliest sign, occurring in cases not severe enough to produce ataxia in lambs. The superficial appearance of "stringy" wool is described, and the condition is identified with that known in South Australia as "straight steely wool" [see *V. B.* 12. 46]. Field observations in Western Australia on "stringy" wool and copper-deficient pastures are summarized. A field trial was conducted in a copper-deficient locality with groups of ewes given copper supplements in various forms. "Stringiness" was found to be definitely associated with copper deficiency, and a further experiment was carried out with six Merino rams selected for high wool quality. Sheep dosed with 15 mg. of copper daily produced wool without "stringiness" and slightly broader in quality than the control group, which all showed "stringiness". Control measures in copper-deficient districts are advocated.—MARGARET H. HARDY.

DICK, A. T., & BULL, L. B. (1945). Some preliminary observations on the effect of molybdenum on copper metabolism in herbivorous animals.—*Aust. vet. J.* 21. 70-72. 2059

In preliminary experiments on six cows, subnormal copper values were obtained on liver samples after they had received molybdenum as sodium molybdate daily over a three-year period.

The work was then extended to studies on toxæmic jaundice in sheep. When the intake of molybdenum by sheep on a normal diet was increased by 10 mg. or 100 mg. per day over a six-month period the copper concentration in the liver was significantly reduced; this also occurred if a copper supplement was added to the diet. The authors discuss the possibility of increased molybdenum of pastures being responsible for "copper deficiency" in some areas.—M. C. FRANKLIN.

GINN, J. T., & VOLKER, J. F. (1944). Effect of cadmium and fluorine on the rat dentition.—*Proc. Soc. exp. Biol., N.Y.* 57. 189-191. 2060

Three groups of rats, each containing 18 littermates, were maintained on the same diet, but received 50 p.p.m. of cadmium (CdCl_2) in the food, 50 p.p.m. of Cd (CdCl_2) in the water, and 50 p.p.m. of fluorine (NaF) in the water respectively; a similar group served as controls.

At the end of 150 days the rats were killed and the dentition examined microscopically for evidence of dental caries. The ability of Cd to diminish the degree of pigmentation of rat incisor enamel was confirmed. The addition of Cd produced an overall bleaching devoid of striations while the pigmentary changes induced by dietary F were characterized by alternate pigmented and non-pigmented striations. Ingestion of Cd also produced a significant fall in blood Hb levels, the greatest decrease being in the group receiving Cd in the water. There was a similar decrease in the Hb of the rats receiving F. Unlike F, addition of Cd did not reduce the experimental caries.—R. ALLCROFT.

SHEEHY, E. J. (1946.) Aphosphorosis in cattle in Offaly. [Correspondence.]—*Nature, Lond.* 157. 442. 2061

Investigations showed that on considerable stretches of pastures in the county of Offaly, Ireland, cows develop an aphosphorosis which can be alleviated by feeding sterilized bone flour at the rate of 2 oz. per day and meat and bone meal (containing 34% of calcium phosphate) at the rate of $\frac{1}{2}$ lb. per day. On such supplements affected animals were completely restored to normal health and reproductive activity in 6-12 weeks. The disorder is known locally as "bog crook", "bog lame", "rheumatism" or "leg fever", the symptoms of which include pica, hidebound condition, staring coat, reduction in milk yield, constipation, emaciation, abnormal posture, difficulty in moving and lameness. In young cattle, growth and development are retarded.—R. ALLCROFT.

RAINEY, J. W. (1945.) An acute case of parturient haemoglobinuria.—*Aust. vet. J.* 21. 73-74. 2062

R. reports the history of a case of parturient haemoglobinæmia or haemoglobinuria. He states that such cases are frequent in Tasmania among cows grazing on green oats and considers that a phosphate deficiency may be implicated.—M. C. FRANKLIN.

PATTON, J. W. (1945.) Differential diagnosis of vitamin A deficiencies and related ailments in cattle.—*Vet. Med.* 40. 163-167. 2063

Pursuing his thesis that acetonæmia in cattle is due to vitamin A deficiency [see *V. B.* 15. 20], P. describes the diagnosis of uncomplicated acetonæmia, in which vitamin A therapy is of benefit (2 doses of 500,000 I.U.). Differential diagnosis and treatment of milk fever, metritis, plant poisonings and atony of the rumen are also discussed. Acetonæmia is often complicated by metritis. The feeding conditions described as predisposing causes for these ailments in the "acetonæmia belt" (southern states of U.S.A.) make it clear that vitamin A and other deficiencies may be involved in any of them.—T. H. FRENCH.

*MOORE, L. A. (1945.) Vitamin requirements of calves.—*Feedstuffs [Minneapolis]*. 17. No. 1. 14. [Abst. in *Biol. Abstr.* Sect. F. 19. No. 7. 26, copied *verbatim*. Signed: E. B. McQUARRIE.] 2064

The vitamin A requirements of young calves may be obtained from colostrum. If whole milk is fed instead of colostrum, vitamin A supplementation is advisable. 15,000 units per day from cod liver oil has been found beneficial in preventing scours and pneumonia. The vitamin D requirement, 3 units per pound per day, will be met by feeding sun-cured hay. Although the B-vitamin requirements of young calves are not known, inclusion of yeast in calf starters may be justified.

I. MOORE, L. A., & BERRY, M. H. (1945.) Vitamin A and carotene content of the blood plasma of dairy calves from birth up to four months of age.—*J. Dairy Sci.* 28. 821-826. 2065

II. SUTTON, T. S., & SOLDNER, P. A. (1945.) Seasonal variations in the blood plasma carotene and vitamin A of adult dairy cattle.—*Ibid.* 859-867. 2066

I. The vitamin A and carotene values were determined every two weeks on blood plasma from about 20 Holstein, ten Ayrshire and ten Guernsey calves from birth up to four months of age by a modification of the method of L. A. MOORE (1939). The plasma vitamin A values varied from 7.2 to 14 μg . per 100 ml. and the plasma carotene values ranged from 16.5 to 100 μg . per 100 ml. The authors regard these vitamin

A values as being in the deficient range when compared with those obtained from calves 4-12 months of age.

Two groups consisting of six and three calves respectively were fed a low carotene hay (no. 1 mixed clover and timothy) and a high carotene hay (lespedeza), respectively, up to 90 days of age and were then given a carotene-deficient diet. The plasma vitamin A values of those on the lespedeza hay were higher than those on the clover-timothy hay and decreased at a slower rate when put on to the carotene-deficient diet indicating greater storage in the liver.

It is suggested that some vitamin A supplement should be given where difficulty in raising calves is encountered.

II. Carotene and vitamin A values were determined at monthly intervals for a period of 24 months on blood plasma from a group of 24 dairy cows, consisting of six animals each of the Jersey, Guernsey, Ayrshire and Holstein breeds, and for a period of 11 months on a group of 16 bulls. Each year the cows were turned out on to permanent bluegrass pasture at the beginning of May, were given supplementary Sudan grass pasture and hay during July and August and were taken off pasture completely about the end of October, when they were maintained on alfalfa and mixed alfalfa hay and alfalfa and corn silages; concentrates were fed throughout the year. The bulls were fed hay and a concentrate mixture, the amount of green food and pasture was limited and no silage was given. As was expected, wide variations in plasma carotene values were found and although the different breeds responded similarly to changes in carotene intake, the extent of the change varied greatly with the breed, being greatest in the Guernseys and least in the Ayrshires and Holsteins.

The vitamin A values showed a distinct breed difference in the response to the increased carotene intake in the spring: except for the Guernseys there was a general downwards trend in the plasma vitamin A levels during May and June. The lowest monthly average for all breeds considered together was 18 μ g. per 100 ml. in June, rising to a maximum of 24 μ g. in October. The changes in the vitamin A levels showed a lag of about one month compared with the carotene levels. The mean vitamin A values in μ g. per 100 ml. for the Ayrshire, Guernsey, Jersey and Holstein groups were respectively 17.7, 20.5, 22.0, and 23.1, indicating a breed difference. In the bulls the low level of carotene intake was reflected in low plasma carotene levels throughout the year. The vitamin A also remained at a lower level than that found for the cows. Plasma ascorbic acid determinations showed variations from 0.2 to 0.7 mg. per 100 ml.—R. ALLCROFT.

BASSETT, C. F., HARRIS, L. E., & WILKE, C. F. (1946.) A comparison of carotene and vitamin A utilization by the fox.—*Cornell Vet.* 36, 16-24. [Authors' summary and conclusions copied *verbatim*.] 2067

Thirty-four fox pups and their dams were put on a vitamin A-deficient diet when the pups reached 21 days of age. They were fed this diet for 14 days. When 35 days old the pups were allotted at random to six experimental groups in each of two series. All the animals received the same vitamin A-low basal diet throughout the experiment, and, in addition, those in series I were given supplemental amounts of vitamin A, while those in series II received carotene fed at the following six levels: 0, 15, 25, 50, 200, and 600 I.U. per kilogram of body weight per day. The pups were weaned at 49 days of age. Blood samples were taken by cardiac puncture at about the middle and at the end of the experiment to determine the vitamin A content

of the blood. All experimental animals were killed at pelted time, the liver was removed, ground and analysed for vitamin A.

The fox can utilize carotene as a source of vitamin A, but such utilization is not as efficient as the vitamin per se.

Until further data are available it is recommended that growing foxes be fed between 100 and 600 I.U. (23.2 and 138.2 micrograms) of vitamin A, or at least 600 I.U. (360 micrograms) of carotene per kilogram of body weight per day. It is probable that a smaller amount of carotene and possibly of vitamin A can be fed when more data are available.

KENNARD, D. C., & CHAMBERLIN, V. D. (1945.) The results when vitamin D and calcium fall the layers.—*Br-m. Bull. Ohio agric. Exp. Sta.* 30. No. 232. 9-15. 2068

This paper describes the effects upon egg production, strength of egg shell, and hatchability of the addition of calcium and vitamin D supplements to the ration of laying fowls. Four groups of 50 Rhode Island Red laying pullets were fed for 46 weeks, commencing October 1st, on a whole maize and oats-mash mixture. One group, the controls, received supplements of oyster shell and vitamin D feeding oil; the second group received vitamin D feeding oil but no oyster shell; the third group received oyster shell but no vitamin D feeding oil, and the fourth group received oyster shell but no vitamin D feeding oil until after February 16th. The birds were all confined to indoor floor pens, the windows being kept open to admit as much sunlight as possible.

Egg production was consistent in the control group throughout the experimental period. In group 2 production was consistently about half that of the control group. In group 3 it was not seriously affected until the end of December; it rose again after April 1st when the birds began to receive the beneficial effects from the sun's rays. In group 4, production increased from a low level of 23% to a high level of 54%, within two weeks of the addition of the vitamin D feeding oil in mid-February.

The effect of the deficiencies of calcium and vitamin D upon the strength of the egg shells was marked in the case of the eggs laid by the birds in group 2, 64-76% being weak or thin-shelled throughout the whole period; at the end of the experiment, the group was given oyster shell and within a week breakage percentage of the shells was reduced from 80 to 15. The effect of the addition of vitamin D oil in mid-February to the ration of group 4 was also very marked. Within two weeks, eggs from this group changed from weak-shelled eggs with a breakage of 71% to strong-shelled eggs with a breakage of only 15%. The weights of the eggs increased by over 5 oz. per dozen. There was a high percentage of breakage of eggs from all groups during the summer months, but with the onset of cooler weather shell strength improved. The authors could suggest no dietary means of prevention or control of this condition.

Vitamin D deficiency affected the hatchability and fertility of eggs more seriously than did the deficiency of calcium. Only 25% of the total of eggs set from group 3 hatched, as compared with 64% in the control group and 48% in group 2.

A study of the figures of the intake of food, shell and grit of the four groups is interesting. The food consumption of group 2 was almost the same as that of the control group, despite the fact that group 2 laid only about half as many eggs. The food required per dozen eggs by this group was nearly twice that of the

control group; the ration itself apparently provided sufficient calcium to enable the fowls to live and produce about half the number of eggs they would have laid with a normal ration of calcium, but it is interesting to note that they also consumed 47 times as much granite grit, which had the appearance of a calcium-bearing material, as did the control group receiving oyster shell. From January to March, group 3, without any vitamin D oil and producing about 20-26% the normal quantity of eggs, consumed nearly 9% more food per bird than did the control group which had a 39-51% egg production during the same period.

These experimental results are discussed and an interpretation is attempted with a view to their practical use by poultry men and in the food trade.—J. D. B.

VICTOR, J., & PAPPENHEIMER, A. M. (1945.) The influence of choline, cystine, and of α -tocopherol upon the occurrence of ceroid pigment in dietary cirrhosis of rats.—*J. exp. Med.* 82. 375-383. [Authors' conclusions copied verbatim.] 2069

Five per cent *L*-cystine in a stock or low protein diet produces ceroid deposits in rat liver. This effect of *L*-cystine is much greater in low protein than in stock diets.

One per cent choline has an inhibiting effect on deposition of liver ceroid resulting from a low protein diet containing excess cystine. The occurrence of ceroid pigment in the livers of rats on a low protein diet, with or without the addition of excess *L*-cystine, is transiently inhibited by the administration of α -tocopherol. Five per cent cod liver oil in the diet did not prevent this effect of α -tocopherol.

On low protein, vitamin E-deficient diets, there occurs after 4 months, a rapid and progress-weight loss. This does not happen when α -tocopherol is added to the diet.

COMMON, R. H., & LAMONT, H. G. (1946.) A field case of nutritional encephalomalacia in chicks.—*Vet. Rec.* 58. 191-192. 2070

This is considered to be the first fully diagnosed case of nutritional encephalomalacia observed in Northern Ireland under ordinary farming conditions.

The condition occurred in a group of 111 Rhode Island Red chicks; for two weeks, progress had been normal but on the 14th day one chick was noticed to be weak on its legs and died the same evening; during the next nine days, there were always four or five chicks showing severe symptoms of leg weakness and in all 29 died between the 14th and 24th day. On the 23rd day, the ration was changed and no further severe cases developed; recovery was complete within a week of the change of ration. Two affected chicks were sent alive to the laboratory. One of the chicks was given massive daily doses of synthetic *dl*- α -tocopherol (Roche) and was fed a different mash; by the third day a considerable degree of recovery was apparent, although the chick still walked unsteadily and its balancing powers were defective. Both chicks were killed for examination P.M. and the pathology and histology of the brain lesions, together with the clinical symptoms, are described; the lesions were similar in the two specimens except that there was evidence of regressive changes in the treated chick.

This group of chicks had been fed from the third day on a proprietary mash containing 2% cod-liver oil, giving the mash an oil content of 6.25%; in addition, the farmer added more cod-liver oil to the mash before using it and an analysis of a sample of the food, as actually given to the affected chicks, showed it to contain 11.0% oil. In view of the observations of other workers on the potent influence of highly unsaturated

fatty acids in increasing susceptibility to vitamin E deficiency the authors ascribe the principal causal role in the present case to the inclusion in the diet of excessive amounts of highly unsaturated fatty acids from fish liver oils.—J. D. BLAXLAND.

GOUNELLE, H., VALLETTE, A., & RAOUL, Y. (1945.) Les besoins quotidiens en vitamine PP. Rapports entre les ingesta et les taux sanguins. [The daily needs in nicotinic acid. The relation between the intake and the blood titre.]—*C. R. Soc. Biol. Paris*. 139. 16-17. 2071

A calorimetric method based on the reaction between cyanogen bromide and *p*-aminophenyl sulphamide was used to estimate the nicotinic acid and nicotinamide in the diet and in the blood of normal subjects and of patients under treatment for TB. In all, 45 subjects were tested and some correlation was found in every case between the amount of nicotinic acid taken in the food and the level attained in the blood. A more definite correlation could be shown when the amounts of assimilable nicotinic acid were calculated on the assumption that about 30% of the total from vegetable sources and almost all from animal sources was assimilated. From these calculations it appeared that for a normal level of 6-8 mg. per litre in the blood, a daily intake of 15-20 mg. assimilable nicotinic acid was necessary.—A. M. COPPING.

DAFT, F. S., KORNBERG, A., ASHBURN, L. L., SEBRELL, W. H., & BAKERMAN, H. (1945.) Anemia and granulocytopenia in rats fed a diet low in pantothenic acid.—*Publ. Hlth Rep., Wash.* 60. 1201-1215. 2072

Rats which were fed on purified diets low in pantothenic acid, developed anaemia, leucopenia, granulocytopenia and bone marrow hypoplasia. Pantothenic acid prevented almost completely the appearance of these deficiencies. Therapeutic measures were less successful in restoring the blood composition to normal. The anaemia responded more consistently to treatment than did the granulocytopenia.—E. KODICEK.

SURE, B. (1941.) Dietary requirements for fertility and lactation. XXX. Role of *p*-aminobenzoic acid and inositol in lactation.—*Science*. 94. 167. [For part XXIX, see V. B. 13. 138.] 2073

SURE, B. (1943.) Dietary requirements for fertility and lactation. XXXI. Further studies on the role of *p*-aminobenzoic acid and inositol in lactation and growth of the albino rat.—*J. Nutrit.* 26. 275-283. 2074

XXX. This is a preliminary discussion of the importance of *p*-aminobenzoic acid as an essential dietary factor for reproduction and lactation in rats. S. obtained definite responses to *p*-aminobenzoic acid in lactation studies on the albino rat as reported below.

XXXI. The results of preliminary tests were confirmed by further experiments and the study was extended to inositol. Of five groups of rats, one, two and three received inositol and *p*-aminobenzoic acid separately from the ration. Inositol was administered in 10-15 mg. daily doses per animal until mating, and in 30 mg. daily doses during the reproduction and lactation periods. *p*-Aminobenzoic acid was fed in 3 mg. daily doses per animal during the first four weeks followed by 7.5 mg. daily doses until breeding and 15 mg. daily doses during pregnancy and lactation. Groups four and five received inositol 0.2% and *p*-aminobenzoic acid 0.2% in the rations.

p-Aminobenzoic acid had a markedly favourable effect on lactation of the albino rat. Inositol produced a very harmful effect on lactation and *p*-aminobenzoic acid exerted a pronounced protective action against inositol injury.—E. M. J.

- I. SPIES, T. D., PERRY, D. J., COGSWELL, R. C., & FROMMEYER, W. B. (1945.) Ocular disturbances in riboflavin deficiency.—*J. Lab. clin. Med.* 30. 751-765. 2075
- II. ANON. (1945.) Ocular signs of ariboflavinosis.—*Brit. med. J.* Dec. 22nd. 889. 2076
- I. Three hundred patients who developed ocular disturbances after subsisting on diets deficient in riboflavin were treated with intravenous injections of riboflavin. The concentration of riboflavin in the blood and urine increased for a few hours after the injection. Within two days 80% of the patients reported remarkable subjective improvement. A diminution in the calibre of the dilated vessels in the eye and a striking decrease in the photophobia and corneal ulceration were observed. 72% of the patients were able to return to work, but the majority had recurrences, as they continued to eat their usual inadequate diets. Ocular manifestations of riboflavin deficiency may occur in either sex and at any age; they may be unilateral or bilateral and occur with or without cheilosis.
- II. Since 1940, circumcorneal injection and corneal vascularization have been accepted as certain diagnostic signs of riboflavin deficiency. An extensive study of 4,000 eyes by slit lamp microscopy was performed by STANNUS (1944) who reported both corneal vascularization and circumcorneal injection, without any evidence of ariboflavinosis. These symptoms appeared in all types of conjunctivitis and were noted in patients whose eyes were exposed to heat and dust, cold wind, bright light, and mild infection. Engorgement of the limbic vessels was therefore not a sure sign of riboflavin deficiency, which should be diagnosed only when new capillaries are observed budding from the apices of the limbal loops and extending on to the cornea. A further criterion is the occurrence of these changes in both eyes round the whole corneal circumference and their response to treatment with riboflavin. A new type of corneal lesion due to riboflavin deficiency has been reported by MANN (1945). The cornea showed marginal vascularization and opacities in the substantia propria. The vessels, which were mostly subepithelial, were arranged in the form of parallel, radially placed loops extending over the cornea in three arcades slightly more than half-way to the pupil-margin. The changes responded promptly to treatment with riboflavin.—E. K.
- Kjos-Hansen, J. (1944.) B-vitaminmangel hos føll. [Vitamin B deficiency in foals].—*Norsk VetTidsskr.* 58. 215-217. 2077
- Three foals, which were weak and had attacks of cramp, were treated by subcutaneous and intravenous injections of B-taxin [thiamine] and the oral administration of "vitamin B". Within a week there was marked improvement. Of a litter of six new-born normal piglets, one, apparently dying, revived upon the injection of 1 ml. of B-taxin.—M. EKENBERG.
- HOPKINS, F. G., & LEADER, V. R. (1945.) On refection in rats and on the nature of the growth promoted by the addition of small quantities of milk to vitamin-free diets.—*J. Hyg., Camb.* 44. 149-157. 2078
- Confirmation was obtained that refection in rats on a diet deficient in the B vitamins becomes established only when potato starch, or occasionally rice starch, is included in the diet. The caeca of refeeding rats were enlarged but the nature of the bacterial flora varied. Feeding roughage, in the form of filter paper dipped in cane sugar, prevented rats from eating their faeces. Potato starch proved to be an essential part of a synthetic diet which allowed proper growth in rats after the addition of small amounts of milk, even though refection did not occur. Some evidence is given to suggest that potato starch contains a growth-promoting factor which is removed by treatment with pepsin and HCl.—A. T. PHILLIPSON.
- VAUGH, M. G., DUTCHER, R. A., GUERRANT, N. B., & BECHDEL, S. I. (1945.) Utilization and excretion of ingested ascorbic acid by the dairy cow.—*J. Dairy Sci.* 28. 769-770. 2079
- A Holstein cow was maintained in normal health for a period of 15 months on a ration very low in ascorbic acid and during this period a normal calf was born. In a four-month period the average daily ascorbic acid intake was 99.7 mg., while the average daily output in the milk and urine was 258 mg. and 57 mg. respectively.
- Plasma values ranged from 0.28 to 0.59 mg. per 100 ml. The colostrum was not appreciably higher in ascorbic acid than the milk. As the lactation period progressed the total daily ascorbic acid excreted in the milk decreased, paralleling the decrease in milk volume. Urinary excretion varied widely, ranging from 14.1 to 97.8 mg. per 24 hours.
- Studies *in vitro* and *in vivo* by means of a rumen fistula made after parturition showed that an amount of 150 mg. crystalline ascorbic acid was rapidly destroyed in the rumen; when it was supplied in a natural form, as dehydrated cereal grasses, destruction occurred at a slower rate, probably because of the slower dissolution of ascorbic acid from the grasses. These studies also indicated that the destruction of ascorbic acid in the rumen was due, at least in part, to the action of the ruminal microflora.—R. ALLCROFT.
- PLATT, B. S. (1945.) Notes on some cutaneous manifestations of dietary deficiencies.—*Brit. med. Bull.* 3. 179-182. 2080
- Changes in the skin and hair have a high value in the diagnosis of dietary deficiencies, particularly in rapid nutritional surveys. There is a need for a better classification of lesions, backed by experimental evidence. Notes are given on the nomenclature, recognition and interpretation of human skin changes, together with 16 original photographs. Minor degrees of deficiency, difficult to diagnose because often multiple, require for their interpretation experience of the more pronounced cases, such as those here illustrated.
- There follows a brief summary of literature on specific deprivation and administration in man and experimental animals of vitamin A, components of the vitamin B₆ complex, vitamin C and certain amino acids and their effect on the skin.—T. H. FRENCH.
- SOUTHCOTT, W. H. (1945.) Congenital goitre in lambs in Tasmania.—*Aust. vet. J.* 21. 35-36. 2081
- A serious outbreak of congenital goitre in lambs is reported from Huonville, near Hobart, an area in which goitre is prevalent among human beings, and has been commonly observed in puppies and horses. The condition was confined almost exclusively to a large group of yearling cross-bred Romney-Merino ewes purchased 6-7 months previously from a district which had no previous history of goitre outbreaks. At parturition, 40% of the ewes gave birth to either dead lambs or lambs so weak that they died within a few hours of birth. Goitres ranged in size from barely palpable unilateral swellings to bilateral enlargements the size of billiard balls. Among 150 full- and broken-mouthed cross-bred ewes mated with the same rams and run on the same pastures, the lambing percentage was above 100 and only two lambs were observed to have goitre. On this property, which had been carrying sheep for six years, increase in mortality rate at lambing coincided with the introduction of young ewes for breeding purposes.—M. C. FRANKLIN.

LESKIEN, I. (1944.) Stoffwechselstörungen beim Sittich und Kanarienvogel und ihre Behandlung. [Metabolic disorders and their treatment in parrots and canaries.]—*Berl. Münch. tierärztl. Wschr. [Wien. tierärztl. Mschr.]* August 4th. 254-255. 2082

The scarcity of rations for parrots and canaries during the war produced, generally at moulting time, a disease due to disorder of the mineral metabolism. The birds lost weight and developed cramp or paralysis of the legs, toes and wings; a characteristic symptom was a dark red coloration of the skin. A single injection of 0.1 ml. "vigantol" rapidly improved the conditions of the birds. Vitamin B₁ was given with good results when paralytic disorders were present.—E. KODICK.

GROENEWALD, J. W., GRAF, H., & CLARK, R. (1941.) Domsiekte or pregnancy disease in sheep—I. A review of the literature.—*Onderstepoort J. vet. Sci.* 17. 225-244. 2083

GROENEWALD, J. W., GRAF, H., BEKKER, P. M., MALAN, J. R., & CLARK, R. (1941.) Domsiekte or pregnancy disease in sheep—II. *Ibid.* 245-296. 2084

CLARK, R., GROENEWALD, J. W., & MALAN, J. R. (1943.) Domsiekte or pregnancy disease in sheep—III. *Ibid.* 18. 203-278. 2085

1. The authors give an extensive bibliography and a critical review of the literature from 1890 onwards. The Afrikaans name "domsiekte", meaning "stupid sickness", is considered to be more descriptive of the disease than the many other synonyms which have been used. Comparisons are drawn between the disease in sheep and pregnancy diseases in other species, including eclampsia in human beings, some of the symptoms of which are said to have a striking resemblance to "domsiekte". The various theories as to aetiology which have been advanced are examined. The authors reject mineral deficiency, toxic absorption from the uterus and lack of exercise as causative factors. Age, over-fatness and changes in climate or in feeding are looked upon as possible indirect causes. Pregnancy has a definite effect and the condition is considered to be essentially a disturbance of metabolism, especially of carbohydrates, usually manifested by a loss of body weight.

II. Experiments were made in an effort to produce clear-cut clinical cases of pregnancy disease. These experiments were based upon the findings of HOPKIRK [see *V. B.* 5. 583] that acetonæmia and fatty livers could be produced by fasting fat ewes.

The food and water consumption was measured of each of 34 Merino ewes in good condition and divided into five groups, in four of which the ewes were pregnant. In the last month of pregnancy the ewes were put on or to drastically reduced rations. The basal ration was supplemented by cane sugar in one of the groups and by blood meal in another. Graphs illustrate changes in body weight in the different groups.

Cases of "domsiekte" occurred at intervals varying from 4-48 days after the ewes were put on to the greatly reduced diet. One ewe in the control group developed slight symptoms following an attack of diarrhoea which caused her to lose weight. The symptoms are detailed: they included stiff gait, nervousness, blindness in one or both eyes, staggering and coma.

See also *absts.* 1967 (niacin, thiamine), 2028 (diet and sheep hookworm), 2030 (starvation of fowls and *Ascaridia* infestation), 2049 (vitamin A and fatal syncope in swine), 2109, 2116 (ascorbic acid), 2103 (rickets), 2192 (pregnancy toxæmia, copper, cobalt, and vitamin A deficiency in sheep in Australia).

PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

CARTER, H. B. (1943.) Studies in the biology of the skin and fleece of sheep. 1. The development and general histology of the follicle group in the skin of

III. Further evidence is produced showing that a sudden drastic reduction in the diet of fat ewes in the fourth month of pregnancy causes the typical clinical, chemical and pathological picture of pregnancy disease. When fat non-pregnant ewes were used, although no clinical symptoms were produced, the changes in the blood chemistry and the P.M. changes associated with the disease were present in some cases. Atrophy of the lymph nodes with a typical reticulo-endothelial reaction associated with the phagocytosis of fats is described and stated to be characteristic of the condition.

Treatment by means of rapidly acting purgatives and sugars is advised.—M. C.

CLARK, R. (1943.) Domsiekte or pregnancy disease in sheep—IV. The effect of obesity on the reaction of sheep to a sudden reduction in diet.—*Onderstepoort J. vet. Sci.* 18. 279-288. [For parts I-III, see *abst. preceding.*] 2086

C. describes a further experiment on the effect of a ration cut on the production of pregnancy disease in sheep. The experiment was devised to see if the food fraction concerned could be determined. The red cell precipitate readings and total and differential leucocyte counts were carried out weekly. Yellow maize was found to be superior to white in causing a gain in weight. Very obese sheep died in 59 to 69 days after being put on a poor diet. Before death they showed hypoglycaemia and acetonæmia. There was a typical fall in the number of lymphocytes and a rise in neutrophils. In sheep in good condition the loss of weight was intermediary between that in the obese sheep and that in the sheep in fair condition. The reaction of sheep to a sudden drop in food intake depends on the amount of fat present in the body. The less fat there is the more likely the sheep is to survive for a long period until it dies of cachexia. Obesity is a potent factor in the causation of pregnancy disease.—E. M. ROBINSON.

KRAUSS, W. E. (1944.) Studies on the nutritional control of milk fever.—*Amer. Miller.* 72. No. 11. 72-73. [Abst. in *Biol. Abstr.* Sect. F. 19. No. 4. 38, copied *verbatim*. Signed: W. F. GEDDES.] 2087

The feeding of 1,000,000 units of vitamin D daily in the form of irradiated yeast to dairy cows for 4 weeks before and 1 week following freshening offered no assurance that milk fever would not occur.

*KRAUSS, W. E. (1944.) Nutritional control of milk fever.—*Feedstuffs [Minneapolis]*. 16. No. 52. 34-35. [Abst. in *Biol. Abstr.* Sect. F. 19. No. 4. 19, slightly amended. Signed: E. B. McQUARRIE.] 2088

During milk fever in dairy cattle, the concentration of Ca and P in the blood is markedly reduced, while the Mg concentration is increased 75%. Because of the relationship between vitamin D and the Ca and P metabolism, it was believed that the increased feeding of vitamin D might lower the incidence of milk fever at freshening by keeping the Ca and P concentration of the blood at a high level. Cows were fed irradiated yeast to furnish 1,000,000 units of vitamin D daily. The incidence of milk fever for these cows was no lower than for a control group, nor was the blood concentration of Ca and P significantly different.

the Merino. 2. The use of the tanned sheepskin in the study of follicle population density. 3. Notes on the arrangement, nomenclature, and variation of

skin folds and wrinkles in the Merino.—*Bull. Coun. sci. industr. Res. Aust.* No. 164. pp. 59. 2089

1. The pre-natal development of hair follicles is described from a series of South African and Australian Merino foetuses, using serial skin sections cut parallel to the body surface. The development of an individual follicle is described and illustrated in six stages. The development of a group of follicles is divided into 18 stages which are grouped into pre-trio, trio and post-trio periods. The changes in the appearance of the follicle groups from birth to maturity are briefly described. A definition is given of the follicle group in the Merino breed, primary follicles being distinguished from secondary by their associated sudoriferous glands and muscles and by their earlier appearance in the foetus. The literature on hair follicle development in the skin of sheep is discussed.

2. Six tanned sheepskin skivers from Merino and British breeds were sampled, each at more than 300 points. Follicle openings were counted on leather discs by means of a microscope fitted with an ocular graticule. Gradients in the density and arrangement of hair follicles are reported, the main ones being a dorso-ventral gradient and a less significant antero-posterior gradient. Highest densities are thus on the anterior portion of the mid-dorsal line. Axillary and inguinal regions are areas of very low density and centres of subsidiary gradients. Regression equations are calculated and tested for the two main gradients. It is concluded that the best single estimate of the mean density of the follicle population of a sheep can be obtained from the mid-side region, about 7-9 in. from the mid-dorsal line and 7-9 in. posterior to the line of the heart-girth.

3. The importance of skin folds and wrinkles in the Merino and the need for more exact descriptions of these characters are discussed. The main folds which may occur are described in anatomical terms. Classifications of Merinos on the basis of wrinkles have been evolved in various countries. Photographic standards are suggested in addition to descriptive and quantitative definitions of fold and wrinkle development. Photographs are presented to illustrate nine grades in neck folds, body folds and breech folds respectively. These may be used for approximate quantitative description of skin fold development in individuals and flocks.

—MARGARET H. HARDY.

ASTRUP, T., & ASTRUP, I. (1939.) Der Einfluss hemmender Substanzen auf das Zeitgesetz der Blutgerinnung. [The influence of inhibitory substance on the blood coagulation time.]—*Enzymologia*. 6. 64-71. [In German.] 2090

The influence of various substances which exert an inhibitory action on the coagulation time of blood has been investigated with a view to finding a relationship between the activating and inhibitory action. Heparin and similar substances appear to be able to neutralize part of the activity of the thrombokinase so that only the residual part of the thrombokinase is free to activate coagulation.

Equations have been formulated by various workers and they are applicable to such inhibitory substances which form a strongly dissociated compound with thrombokinase. The theory upon which the calculation of the equations depends has been subjected to critical experimental study.—E. M. J.

ZELDIS, L. J., ALLING, E. L., MCCOORD, A. B., & KULKA, J. P. (1945.) Plasma protein metabolism—electrophoretic studies. The influence of plasma lipids on electrophoretic patterns of human and dog

plasma.—*J. exp. Med.* 82. 411-430. [Authors' summary copied verbatim.] 2091

Electrophoretic patterns of human and dog plasma are markedly altered by the extraction of a large part of the plasma lipids. Total electrophoretic areas, relative areas of individual electrophoretic components, and electrophoretic albumin:globulin ratios undergo change.

For human plasma, such extractions confirm previous observations that a particularly rich lipid content characterizes beta globulin. Abnormally large beta peaks regularly occur in the presence of elevated plasma lipids. Marked increases in gamma globulin, however, are also found to be due in large part to elevated plasma lipid levels in certain abnormal human plasmas.

The greatest relative amount of lipid in dog plasma, in contrast to human plasma, is associated not with the beta globulin, but with components usually designated as alpha globulins.

Not only the areas, but the configuration and the number of alpha globulin peaks in dog plasma are altered by the extraction of plasma lipids. The results demonstrate that increased alpha globulin areas which occur in the plasma of hypoproteinemic dogs are due in large part to elevated plasma lipid levels.

*WINKLER, H. J. (1942.) Die praktische Bedeutung der Kreuzprobe bei der Bluttransfusion am Pferde. [The value of the cross-test for blood for transfusion in horses.]—*Inaug. Diss., Hanover*. [Abst. from abst. in *Dtsch. tierärztl. Wschr.* 51. 72.] 2092

The technique of the cross-test is described. It does not appear to be reliable for the determination of suitable blood donors.—J. ZWEIF.

GÖLDENHAUPT, G., & WEILER, H. (1944.) Blutzuckeruntersuchungen nach intravenösen Peristongaben bei Pferd und Hund. (Vorläufige Mitteilung.) [Blood sugar estimation after intravenous injection of "periston" in horses and dogs (preliminary article).]—*Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* 52/50. 201-202. 2093

Periston [a synthetic colloid], injected in 2 ml. doses, produces in dogs a marked rise in blood sugar, which reaches a peak about two hours later. Larger doses, given 24 and 48 hours after the first injection, produce little if any result. Experiments on the horse produced similar results except that the peak of the blood sugar curve after the first injection occurred at eight hours and the rise was small compared to that of the dog.—A. T. PHILLIPSON.

*GYARMATI, E. (1944.) [Estimation of the residual nitrogen in the blood plasma of the horse.]—*Közl. Összeh. élet- és kortán Köröböl.* 32. 90. [Abst. from abst. in *Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* 52/50. 206.] 2094

A rapid method of estimating non-protein nitrogen in plasma is described. Non-protein nitrogen in the plasma of normal horses is in the region of 24-49 mg.%, approximately 2-14 mg. % lower than in whole blood.

—A. T. PHILLIPSON.

BRITTON, J. W. (1946.) Changes of the blood constituents in diseases of ruminants.—*Cornell Vet.* 36. 25-30. [Author's summary copied verbatim.] 2095

Normal values for hemoglobin cell volume, sugar and non-protein nitrogen of the blood of 134 sheep under varying conditions of management were ascertained. The biochemical changes accompanying various digestive disorders in sheep and cattle are enumerated. More work on the biochemical approach

to the diagnosis, prognosis and therapy of diseases of domestic animals is indicated.

ANDREASEN, E. (1945.) On the quantitative relationship between the lymphoid organs and the blood lymphocytes in the albino rat.—*Acta path. microbiol. scand.* 22, 256-270. [In English.] 2096

Several observations suggest that quantitative variation in the amount of lymphatic tissue is followed by similar variation in the numbers of circulating lymphocytes; thus, in man, lymphoid organs are best developed in infancy when physiological lymphocytosis is present, and the amount of lymphoid tissue decreases with increasing age, accompanied by a similar reduction in the number of circulating lymphocytes. During starvation the lymphoid organs undergo progressive atrophy and the number of circulating lymphocytes decreases progressively in the blood. Hyperplastic increase in the lymphoid organs is also accompanied by lymphocytosis.

This investigation was undertaken to see if in normal animals there was a direct relationship between the weight of the lymphoid organs and the numbers of circulating lymphocytes, as estimated by differential counts of the white cells in the blood. The results failed to show any correlation.—A. T. PHILLIPSON.

DEANE, H. W. (1946.) The basophilic bodies in hepatic cells.—*Amer. J. Anat.* 78, 227-243. [Author's summary slightly amended.] 2097

The reversal of the dye affinity of the basophilic bodies in the cytoplasm of liver cells after treatment by the enzyme ribonuclease indicates that their affinity for basic dyes, like that of the Nissl bodies, is due to the presence of ribonucleic acid. Likewise, the basophilic background encountered after some mitochondrial stains (phosphotungstic-acid hematoxylin and iron-alum hematoxylin) is extinguished by ribonuclease, so that it, too, is the ribonucleoprotein.

The basophilic material is sparse and fibrillar in the cells of the peripheral zone of the lobule but is greater in amount and clumped in the cells in the middle and central zones. The degree of clumping, however, is greater after acid than after alkaline fixation. Liver basophilia is low in animals killed three hours after a known feeding time; 12 hours after feeding there is an increase in the amount of stainable material; 24 hours after feeding it is more dispersed and diminishes rapidly.

There is no evidence to support the suggestion by Bartelmez and Bensley ('32) that glycogen may sometimes account for cytoplasmic basophilia. By and large, there is an inverse relationship between these two substances in the hepatic cells.

As in other tissues, the basophilia is probably associated with protein synthesis—in this instance the synthesis of some or all of those serum proteins formed by the liver. The cyclic variations in the quantity of basophilic substance in the liver are attributed to changes in the quantity of this production.

I. HUNGATE, R. E. (1942.) The culture of *Eudiplodinium neglectum*, with experiments on the digestion of cellulose.—*Biol. Bull., Wood's Hole*. 83, 303-310. 2098

II. HUNGATE, R. E. (1943.) Further experiments on cellulose digestion by the protozoa in the rumen of cattle.—*Ibid.* 84, 157-163. 2099

I. Attempts were made to develop *in vitro* methods for the growth of rumen protozoa of cattle in order to obtain further evidence of their capacity to digest cellulose. Factors of importance in preparing the medium were the presence of cellulose, the concen-

trations of inorganic salts (especially NaCl), anaerobic conditions, a suitable pH and the concentration of protozoa.

A medium containing grass and cellulose in addition to inorganic salts supported a continuous culture of *Eudiplodinium neglectum* for 22 months. An enzyme extract was prepared from the protozoa and was found to be most active at about pH 5.0. *Eudiplodinium* enzymes acting on cellulose give a product which forms glucosazone. The cellulose appears to undergo decomposition to cellobiose as an intermediate product and finally to glucose. Since the ruminant is unable to digest cellulose, any digestion of the cellulose is helpful to the host and the relationship is one of symbiosis.

II. The investigation was extended to other forms of rumen protozoa. *Diplodinium maggii*, *D. multivesiculatum*, *D. denticulatum* and *Entodinium caudatum* were grown in a medium containing ground grass, cellulose, ground wheat, either singly or mixed, depending on the species being cultured, and balanced salt solution, and incubated at 39° C. under anaerobic conditions.

Clone cultures were obtained by isolating single individuals in 5 ml. of salt solution containing grass in special anaerobic vessels permitting frequent observations. The rate of division was found to be of the order of once per day. Wide variations were found in the morphology of individuals in clone cultures of *D. denticulatum* and *E. caudatum*.

Cultured protozoa were used either at once for the preparation of enzyme extracts, or transferred to another flask and starved before extraction. Extracts were tested for their cellulolytic activity at a pH of 5.8. In *D. maggii* a cellulase is elaborated within the bodies of the protozoa and there is a rapid synthesis of food reserves from cellulose. By cultural studies and from experiments on cellulose digestion by extracts of the protozoa it was found that the three species of *Diplodinium* digest cellulose but *E. caudatum* does not. *Diplodinium* is the only protozoan which may be considered a symbiont.—E. M. J.

WATSON, R. H. (1944.) Studies on deglutition in sheep. 1. Observations on the course taken by liquids through the stomach of the sheep at various ages from birth to maturity.—*Bull. Coun. sci. industr. Res. Aust.* No. 180. pp. 7-94. 2100

WATSON, R. H., & JARRETT, I. G. (1944.) Studies on deglutition in sheep. 2. Observations on the influence of copper salts on the course taken by liquids into the stomach of sheep.—*Ibid.* pp. 95-126. 2101

1. In an introductory section, W. discusses the anatomical and physiological aspects of the ruminant stomach, giving a review of the literature. The activity involved when fluid passes direct to the abomasum is fully described, including the neural mechanism, which may be involved. X-ray examinations followed the administration of barium sulphate suspensions and the techniques involved are fully described.

When, in response to appetite for milk, milk-and-water barium sulphate suspensions were consumed by sheep, they were swallowed into the abomasum in at least 90% of the observations. This continued for over four years in two sheep which maintained a keen appetite for milk, but after the appetite for milk began to decline in the other animals, progressively less of the suspension passed to the abomasum, until finally it all passed to the forestomachs. The appetite for milk was reawakened in two of these animals after it had largely disappeared, and during this period most of the test suspension usually passed direct to the abomasum.

When milk-and-water barium sulphate suspensions

were consumed to quench thirst, most of the material passed into the forestomachs, irrespective of the temperature of the fluid. Ingestion from an open vessel or from a rubber nipple by sucking did not affect the result.

The course taken by water barium sulphate suspension when given as a draught or drench varied with individual sheep. In some sheep, up to four years of age, it always passed either completely or partly to the abomasum. In others it often passed there, but in others still, it rarely did so.

2. Studies previously noted [*V.B.* 12. 239 & 352] are extended.

In many sheep, water barium sulphate suspension passed to the abomasum more frequently, or in greater quantity, when given shortly after a solution of a copper salt.

Best results were obtained with about 10 ml. of as high a concentration of copper salt as possible, leaving an interval of not less than 5 sec., and preferably of 8 sec., before administration of the water barium sulphate suspension. Both solutions were best given into the back of the mouth. Behaviour was influenced little by the temperature of the suspension, the animal's condition and its state of hunger and thirst. Neither was it influenced by the animal being turned on its back, or by the speed of administration.

Frequently the response to copper sulphate solution did not begin for some seconds after the delivery of the solution into the mouth, but it usually persisted for more than a minute. It persisted longer following the use of 10 ml. of 0.40 M solution (10%) than when 10 ml. of 0.08 M solution (2%) or 2 ml. of 0.40 M solution were used.

Stimulation of the reflex appears to occur in the mouth or pharynx or both, and is considered to be either mechanical or chemical, or both. The chemical stimulation provided by solutions of copper salts (cupric sulphate, cupric chloride, cupric nitrate and cupric acetate) cannot be attributed to the anions of the salts, to the astringency or the hydrogen-ion concentration, or to osmotic effects. It must be attributed to cupric ions.

To enable a solution of a copper salt to pass direct to the abomasum, or if a solution of a copper salt is being used as a vehicle to carry another liquid to the abomasum, the degree of mechanical stimulation must be increased so that the liquid is not swallowed before the onset of response to chemical stimulation; the total volume of the liquid should therefore be kept as large as possible without reducing the concentration of the copper salt below 0.08 M (2%).—H. MCL. G.

*BONGERT, J. G. (1942.) Wesen und Ursache der Totenstarre. [The nature of rigor mortis.]—*Dtsch. Schlachthztg.* 42. 181-187. [Abst. from abst. in *Jber. Vet.-Med.* 71. 253.] 2102

The origin of rigor mortis is considered to be the swelling of the muscle fibres under the action of lactic acid combined with an equal tension of the extensor and flexor muscles. The essential condition for rigor mortis is the extension of the spine and limbs and oxygen deficiency, *viz.*, an unopened body. It is denied that rigor mortis occurs in slaughtered animals. Limbs which are fixed in the flexed condition at death, and limbs with cut flexor and extensor tendons do not show rigor mortis. After section of the tendon, muscles in a state of rigor mortis soften immediately. B. says that this results in an increase of the muscle circumference, but in another place he says the circumference decreases. The effect of disease conditions of the muscles and tendons is also discussed.—U. F. R.

REED, C. I., & REED, B. P. (1942.) An attempted correlation of mechanical properties of bone with antirachitic healing and with molecular structure as determined by X-ray diffraction technic.—*Amer. J. Physiol.* 138. 34-41. 2103

The identity of bone salts with apatite is confirmed by the identical appearance of the plates recording the diffraction of X-rays when passed through powdered bone and powdered apatite. The characteristic diffraction that occurs with normal bone is altered in rachitic bone and appears to be irreparable. Disorientation, as is seen in rachitic bones, persists after clinical recovery and there appears to be no correlation between it and the ability of the bone to resist mechanical stress.—A. T. P.

GÖTZE, R. (1943.) Über die Zukunft der künstlichen Besamung der Haustiere werden Taten entscheiden—nicht Worte. [The future of artificial insemination.]—*Dtsch. tierärztl. Wschr.* 51. 49-52. 2104

This is a detailed answer to criticisms raised elsewhere against the practice of artificial insemination. G. concludes by asking that the ascertained facts be allowed to decide the case for artificial insemination in preference to theoretical arguments.—A. T. PHILLIPSON.

SMITH, P. E. (1944.) Maintenance and restoration of spermatogenesis in hypophysectomized rhesus monkeys by androgen administration.—*Yale J. Biol. Med.* 17. 281-287. 2105

In monkeys, intramuscular injections of androgen from the time of hypophysectomy maintained spermatogenesis to a variable extent in the seminiferous tubules, which did not, however, remain at their normal size. Spermatogenesis was restored in some of the tubules even if androgen administration was postponed for as long as 57 days after hypophysectomy. Intratesticular implantations of androgen pellets gave a more complete restoration of spermatogenesis than did intramuscular injections, but the effect was localized around the pellets, tubules lying at some distance away being completely involuted.—E. COTCHIN.

DAY, E. T., & HAMMOND, J., JR. (1945.) Lactation in heifers induced by oestrogen implants.—*J. agric. Sci.* 85. 150-157. 2106

Average lactation curves were obtained from certain heifers treated with synthetic oestrogen implants in the authors' previous experiments [see *V.B.* 15. 402]. Further observations were made on these animals and the results analysed. Treatment over a period of 100 days appeared to be less satisfactory than a treatment period of 60 days, but the optimum duration appeared to depend mainly on the way lactation developed. The yields obtained in the induced lactation were compared with those obtained at the subsequent normal lactation and it was shown that the induced lactation yields very nearly approached those that would have been expected from normal lactation. Lactation was induced in a heifer by treatment with hexoestrol and during a period of 340 days she yielded 603 gal. Six weeks after the end of that period she was further-treated with stilboestrol, as a result of which, during a comparative 340-day period, she yielded 412 gal. The subsequent breeding histories of a number of the oestrogen-implanted heifers are outlined.—ALFRED T. COWIE.

COWIE, A. T. (1944.) Addendum. Fracture of the pelvic bones in bovines implanted with tablets of synthetic oestrogens.—*J. Endocrinol.* 4. 19-22. 2107

21 heifers and nine cows, all infertile, were treated experimentally by subcutaneous implantation of oestrogen tablets to induce lactation. In an addendum to the report of these experiments [see *V.B.* 15. 401], C. discusses the fractures of pelvic bones which occurred

in five heifers and two cows of the series. The site of injury and degree of repair were determined in five cases; in three of these one ilium and in two both ilia were fractured. The oestrogen-treated animals displayed symptoms similar to those of naturally occurring nymphomania due to cystic ovaries. The immediate cause of fracture is believed to be trauma sustained during the persistent nymphomaniac "mounting" behaviour. Fractured bones which were examined chemically and by X-rays showed no evidence of rarefaction. Changes are described in the morphology of the hind-quarters due to relaxation of the pelvic ligaments. Such changes probably predispose to fracture.—T. H. F.

ANON. (1945.) Relaxin.—*Brit. med. J.* Oct. 27th. 576. 2108

In this annotation investigations into the hormonal mechanisms controlling relaxation of the pelvic ligaments during pregnancy are briefly reviewed and the interaction of the hormones involved (relaxin, oestrogen, progesterone) is discussed. In view of the clinical significance of this mechanism, it is hoped that further investigation will be carried out on the human subject. [See also abstr. preceding.]—ALFRED T. COWIE.

See also abstr. 2073, 2074 (fertility and lactation), 2078 (refection in rats), 2192 (reproductive physiology of Merino sheep), 2201 (amino acids and proteins), 2202 (bio-energetics and growth).

POISONS AND POISONING

WYSSMANN, E. (1945.) Rückblick auf Vergiftungsfälle bei Tieren. [Poisoning in domestic animals.]—*Schweiz. Arch. Tierheilk.* 87. 142-154 & 222-233. 2111

During 30 years of practice, W. observed various types of poisoning in animals. In cattle, toxic symptoms appeared on intake of alcohol, lead, sodium nitrate, sodium chloride, copper sulphate, mercuric chloride and kerosene. Pigs were poisoned by carbon monoxide and cocaine and silver foxes by tetrachloroethylene.

Acute alcohol poisoning in cattle occurred near breweries when the animals consumed large quantities of foods containing alcohol. The symptoms included excitation, reddening of mucosae, tachycardia, giddiness, paralysis and total collapse.

Arsenic poisoning was observed occasionally in horses and chicks. Trout which had been killed by benzol poisoning showed a characteristic dark red discoloration of the gills. Lead poisoning in cattle caused emaciation, weakness, paralysis and a characteristic diarrhoea. Sodium nitrate in cattle produced weakness, extreme thirst and shortness of breath. Death usually supervened and on P.M. examination, severe gastro-enteritis was found. Sodium chloride poisoning occurred in cattle after an intake of 3-6 lb. of salt per day. The symptoms were that of a severe gastro-enteritis, weakness and paralysis.

Carbon monoxide poisoning in pigs was occasionally noted. The animals showed paralytic symptoms and the diagnosis was confirmed by the colour of the blood. Cocaine poisoning in piglets was observed in one case where an injection of 0.25 g. of cocaine hydrochloride had been given. Cyanosis, tachycardia and tachypnoea appeared. Cramps and opisthotonus followed, but the animal recovered eventually. Copper poisoning in cattle resulted from vaginal application of copper sulphate bougies, which induced an acute haemorrhagic nephritis. Kerosene poisoning in cattle after external application was accompanied by a severe dermatitis and haematuria. Phosphorus poisoning in chicks resulted in weakness, giddiness, thirst, appearance of diarrhoea and jaundice caused by haemorrhagic

DAVIDSON, J. L. (1946.) The relationship of vitamin C to wound healing.—*Vet. Med.* 41. 140-141. 2109

The role of vitamin C in wound healing is briefly reviewed, with special consideration of its importance for the production of the intercellular collagen essential for clean healing. It is recommended that after operations on small animals for such disorders as pyometra and endometritis, 50-200 mg. ascorbic acid be given daily to aid healing.—A. M. COPPING.

VAU, E. (1943.) Die Ohrmuskeln und der Schildknorpel des Ohres bei steh- und hängeohrigen Schweinen. [The ear muscles and ear cartilage of erect- and drop-eared pigs.]—*Berl. Münch. tierärztl. Wschr./Wien. tierärztl. Mschr.* June 11th. 181-183. 2110

A comparison of the anatomical features of the ears of different breeds of pigs revealed that the most important differences are in the shape and size of the scutiform cartilage and in the orientation of muscles. These are dependent upon form and position of the ear and accommodation to movement. As would be expected it was also found that muscles varied in size, presence and continuity with adjacent muscles.

—C. W. OTTAWAY.

enteritis and toxic hepatitis. Oral intake of 4-8 g. of mercuric chloride in cattle was lethal. Leaves of the box tree (*Buxus sempervirens*) were toxic to goats. A severe enteritis and progressive weakness was followed by quick death. Nicotine poisoning in the horse produced gastric disturbances and a severe bradycardia with an irregular pulse rate, but injection of caffeine and administration of charcoal improved the condition within a few days. Mouldy fodder produced in cattle symptoms similar to those of foot and mouth disease. Consumption of the rhizome of white hellebore (*Veratrum album*) by cattle resulted in progressive weakness and vomiting.—E. KODICEK.

MOULE, G. R. (1945.) Salt poisoning of sheep following evaporation of saline waters.—*Aust. vet. J.* 21. 37. 2112

A case of salt poisoning is reported from Central Queensland. Losses were due to excessive evaporation of water from the surface of the storage tank and trough. Analyses of the saline content of samples of the sub-artesian bore water collected from delivery pipe, storage tank, and drinking trough gave 420, 720 and 1,650 grains per gal. These figures were in keeping with evaporation rate data supplied by Winton recording station.—M. C. FRANKLIN.

I. BLAXLAND, J. D., & GORDON, R. F. (1945.) Zinc phosphide poisoning in poultry.—*Vet. J.* 101. 108-110. 2113

II. SALT, F. J. (1945.) Detection of zinc phosphide. *Ibid.*—111. 2114

I. Since the introduction of zinc phosphide as a vermin poison, cases of poisoning in poultry with this substance have been observed. Oral dosing of ten birds with varying amounts of zinc phosphide showed that the M.L.D. was approximately 1 grain for a 5 lb. bird or 20-30 mg. per kg. body weight. The symptoms and changes found P.M. in birds dosed experimentally are described and the differential diagnosis of poisoning by phosphorus, arsenic, zinc phosphide and cacao residues is briefly discussed.

II. A simple and rapid chemical method: is described by means of which the presence of Zn_3P_2 can be detected when the quantity is too small to be diagnosed by the characteristic odour of the substance on P.M. examination.

The method consists of heating the material containing Zn_3P_2 with dilute HCl and absorbing the liberated PH_3 in potassium permanganate. The phosphate thus formed is then converted into a reduced phosphomolybdic compound according to the method of FISKE and SUBBAROW (1925) and the excess $KMnO_4$ is decolorized by the reducing agent. The colour developed is proportional to the amount of phosphate formed from the original Zn_3P_2 .—R. ALLCROFT.

WALBUM, L. E. (1944.) Die Einwirkung des Mangans auf die Fähigkeit des Organismus, Giftstoffe bakterieller oder anderer Natur unschädlich zu machen (adzubauen). [Effect of manganese on the capacity of the body to render innocuous toxins and other poisonous matter].—*Acta path. microbiol. scand.* 21. 3-19. [In German.] 2115

The protective action of manganese was tested in mice against tetanus toxin, *Cl. oedematis* toxin, saponin, ethyl alcohol, urethane, cocaine hydrochloride, phenyl and diethyl barbiturate, by the injection of varying quantities of manganese 1-2 hours after the subcutaneous administration of the toxic material. The severity of the toxic symptoms observed was expressed by a scale of four to eight degrees. It was found that manganese has a protecting action, the optimum dosage depending on the nature of the toxin and varying from 0.079 μ g. for ethyl alcohol to 79 μ g. for tetanus toxin. —B. CINADER.

SULLIVAN, W. R., GANGSTAD, E. O., & LINK, K. P. (1943.) Studies on the hemorrhagic sweet clover disease. XII. The effect of l-ascorbic acid on the hypoprothrombinemia induced by 3,3'-methylenebis (4-hydroxycoumarin) in the guinea pig. —*J. biol. Chem.* 151. 477-485. [For part XI, see *V. B.* 18. 371.] 2116

OVERMAN, R. S., STAHMANN, M. A., HUEBNER, C. F., SULLIVAN, W. R., SPERO, L., DOHERTY, D. G., IKAWA, M., GRAF, L., ROSEMAN, S., & LINK, K. P. (1944.) Studies on the hemorrhagic sweet clover disease. XIII. Anticoagulant activity and structure in the 4-hydroxycoumarin group.—*Ibid.* 153. 5-24. 2117

FIELD, J. B., LARSEN, E. G., SPERO, L., & LINK, K. P. (1944.) Studies on the hemorrhagic sweet clover disease. XIV. Hyperprothrombinemia induced by methylxanthines and its effect on the action of 3,3'-methylenebis-(4-hydroxycoumarin).—*Ibid.* 156. 725-737. 2118

XII. The extent and duration of the hypoprothrombinemia produced by the oral administration of 5.0 mg. of 3,3'-methylenebis-(4-hydroxycoumarin) was much greater in scorbutic g. pigs than in non-scorbutic animals. Single doses of 100 mg. of l-ascorbic acid did not protect non-scorbutic animals from the hypoprothrombinemia induced by the anticoagulant, but repeated doses of the same amount of the vitamin for four days prior to administration of the anticoagulant and also with the anticoagulant did exert a protective effect.

Total or partial depletion, and adequate or high intakes of vitamin C produced no change in the prothrombin time of diluted (12.5%) plasma of g. pigs. The clotting time of whole plasma was increased slightly but evidence is given that this was not due to a change in the prothrombin level or activity.

XIII. Of 106 compounds in the 4-hydroxycoumarin class or related to it, 3,3'-methylenebis (4-hydroxycoumarin), the causative agent of hemorrhagic sweet clover disease of cattle, was found to be the most potent anticoagulant on the basis of the hypoprothrombinemia produced by a single oral dose with standardized rabbits as the test animals.

The molecular structures necessary for minimal and high anticoagulant activities are given.

XIV. Single oral doses of the methylxanthines caffeine, theobromine, and theophylline, caused a hyperprothrombinemia as reflected by shortened plasma prothrombin times, in the dog, rat and rabbit. This effect was not exhibited by other purines, pyrimidines and related compounds.

As a result of the induced hyperprothrombinemia, the hypoprothrombinemic action of the anticoagulant 3,3'-methylenebis (4-hydroxycoumarin) was lessened. When given either with, or 24 hours after the anticoagulant they shortened the duration as well as reduced the intensity of the hypoprothrombinemic response.

It is suggested that this reaction is due to a functional stimulation of hepatic tissue by these compounds.

—R. ALLCROFT.

CAMERON, G. R. (1945.) Risks to man and animals from the use of 2,2-bis (p-chlorophenyl), 1,1,1-trichloroethane (DDT) : with a note on the toxicology of γ -benzene hexachloride (666, gammexane).—*Brit. med. Bull.* 3. 233-235. 2119

Although D.D.T. poisoning has been experimentally produced in animals with characteristic symptoms and pathology, C. emphasizes that the risks to human beings at the 0.5-1.0% concentration usually employed are very slight even on prolonged exposure. Risks attendant upon the handling of more concentrated solutions in oil and in emulsions are correspondingly greater particularly with careless use, but may be reduced to negligible proportions by the employment of protective gloves and garments, and of respirators where sprays are in use. Gammexane (666) is more toxic to animals than D.D.T., but with reasonable care in handling there is little danger to human beings. Symptoms of acute gammexane poisoning in animals include increased rate of respiration, restlessness and frequency of micturition, intermittent muscular spasms, salivation and grinding of the teeth, loss of balance, head retraction, convulsions, biting and finally, collapse and death. Pathological findings are not very characteristic nor constant. C. emphasizes the need for keeping active watch on the health of workers employed in the manufacture and handling of this compound.—A. EDEN.

STEYN, D. G., & VAN DER WALT, S. J. (1941.) Recent investigations into the toxicity of known and unknown poisonous plants in the Union of South Africa, XI.—*Onderstepoort J. vet. Sci.* 16. 121-147. [For part X, see *V. B.* 15. 205.] 2120

VAN DER WALT, S. J., & STEYN, D. G. (1941.) Recent investigations into the toxicity of known and unknown poisonous plants in the Union of South Africa, XII.—*Ibid.* 17. 211-223. 2121

XI. Plants of 16 species were studied for toxicity. Three, namely *Senecio pterophorus* DC, *Kalanchoe paniculata* Harv. and *Kalanchoe thyrsiflorae* Harv., were shown for the first time to be toxic. Results were not conclusive in the case of *Crotalaria rhodesiae* Baker f. and *Pseudogaltonia clavata* (Baker) Phillips. The latex of *Arauja serisifera* Brot. was shown to have irritant properties when applied to the skin.

The alkaloids isatidine and retrorsine produced the typical symptoms and P.M. and histological lesions of "dunsiekte" when fed to horses and are considered to

be the active principles of the species of *Senecio* from which they were isolated.

Lantana camara, previously reported to be poisonous by Tucker, was also studied. It was shown to be toxic for sheep, the symptoms including general icterus, constipation and photosensitization with mummification of the skin of the nose, face and ears. The literature on poisoning by *L. camara*, *L. Sellowiana*, *L. crocea* and *L. salicifolia* is discussed: it appears that there has been some doubt about the identity of *Lantana camara* and *L. crocea*. Poisoning in the field by *L. camara* is stated to be not uncommon in the Durban area where the plant is commonly grown as an ornamental hedge.

XII. Fourteen plants were examined for toxicity, of which three, namely *Mesembryanthemum angulatum* Thunb., *Kalanchoe rotundiflora* Harv., and *Urginea rubella* Baker, were for the first time proved toxic. Experiments with fungus-infected mangolds and *Scilla oratifolia* Baker form were inconclusive. *Poinciana pulcherrima* L. was shown to be cyanogenetic while *Ornithogalum thyrsoides* Jacq. was proved capable of causing blindness.—M. C.

VAN DER WALT, S. J., & STEYN, D. G. (1943.) Recent investigations into the toxicity of plants, etc. XIII. —*Onderstepoort J. vet. Sci.* 18. 207–224. [For parts XI & XII, see absts. preceding.] 2122

XIII. In all, 22 plants were investigated, of which six were shown for the first time to be toxic. These were *Boscia foetida*, *Cadaba juncea*, *Othoma chrytifolia*, *Drimia alta*, *Scilla natalensis* and *Jasminum angulare*. Four others gave inconclusive results in tests, *Berkheyopsis echinus* and *B. bechuanensis*, *Gliciridia maculata* and *Datura arborea*. The other plants were, *Haemanthus magnificus*, *Epaltes alata*, *Othoma pallens*, *Platycaurpa*

See also absts. 1962 (selenium), 2050 (ragwort poisoning), 2059 (molybdenum), 2060 (cadmium and fluorine), 2167 (poison gases), 2174, 2177, 2178 (food poisoning), 2179 (ANTU as rat poison), 2192 (oxalate poisoning of sheep in Australia), 2200 (toxicology).

PHARMACOLOGY, THERAPEUTICS AND DISINFECTION

— (1945.) Sulphonamides in general veterinary practice. Discussion by the Central Veterinary Society. [Speakers:—BROWNLEE, G., & BARRETT, E. P.]—*Vet. Rec.* 57. 229–233 & 245–248. 2124

BROWNLEE sketched the development of the study of sulphonamide therapy based on knowledge of the nutrition of bacteria, yeasts and animals. The investigation of nutrition involved the discovery of vitamins and the essential amino acids and a number of these were also found to be necessary for the growth of some bacteria. For successful chemotherapy a bacteriostatic concentration must be attained rapidly and maintained without remission in the infected tissue for a period longer than the growth phase of the organism. Inadequate dosage is dangerous as the parasite may develop resistance in the presence of low concentrations of a sulphonamide. The dosage of an antibiotic required may depend upon the concentration of an essential metabolite (biotic) in the host. Examples are given of the variation in resistance to sulphonamides of a number of strains of *Bacterium coli* isolated from a number of fatal cases of "white scour", in calves. The data suggest that succinyl sulphathiazole should be effective in treatment of white scour. To assess the effect of different sulphonamides, they should be tested against the organism in the medium in which they grow, e.g., milk-borne pathogens should be tested in milk. Strains of *Streptococcus agalactiae* are susceptible to sulphonamides in milk but not susceptible in Wright's broth. This difference is due to the fact that milk contains almost no *p*-aminobenzoic acid while the broth has

glomerata, *Medicago sativa*, *Phaseolus vulgaris*, *Dipcadi* sp., *Drimopsis maculata*, *Urginea macrocentra*, *Thesium lineatum* and *Gnidia caffra*.

The pupae of *Acanthopsycha junodi*, the wattle bag worm, were not proved toxic but the larvae of *Laphygma exempta* were poisonous. Cases of poisoning in cattle from consuming mine compound waste were investigated. Although symptoms of poisoning could be produced experimentally with the material, it was not found possible to determine the toxic substance. The material had undergone marked fermentation and decomposition from standing in the hot sun.—E. M. R.

CILLI, V., & CORAZZI, G. (1944.) Studio sugli antigeni del veleno di *Echis carinatus* eritreo e sui corrispondenti anticorpi. [Antigens of the venom of *Echis carinatus* in Eritrea and the corresponding antibodies.]—*Boll. Soc. ital. Med. Ig. trop. (Ses. Eritrea) Asmara*. 4. No. 4. Reprint pp. 43. [English summary.] 2123

Venom from the snake *Echis carinatus* contains several fractions, enzymatic in nature, whose actions can be demonstrated both *in vivo* and *in vitro*. The venom is cytolytic, haemorrhagic and neurotoxic; these actions may be caused by a single substance, namely lecithinase. The venom is also proteolytic, causing local necrosis *in vivo*, and liquefaction of solid serum, fibrin, and gelatin *in vitro*. It causes clotting of blood by its action on the thrombocytes; it also clots milk.

Antiserum prepared in the horse neutralizes the toxic and enzymatic actions, but in varying proportions. It seems, therefore, that the *in vivo* method of titrating antiserum is the only feasible one for the titration of antitoxic power.—I. W. JENNINGS.

20–50 times as much. Benzylamine-4-sulphonamide is not a typical sulphonamide drug as its action is not neutralized by *p*-aminobenzoic acid but when applied locally it acts on streptococci, staphylococci and anaerobes.

BARRETT discussed the clinical use of sulphonamides. Although sulphonamides are generally effective against streptococcal mastitis, outbreaks sometimes occur which do not respond. Good results have been obtained by infusion of sulphanilamide L.S.F. (sulphanilamide lactoside sodium formaldehyde sulphonylate). The successful treatment of mastitis due to *Corynebacterium pyogenes* with sulphapyridine, and of pyrexia of unknown origin in cows with sulphonamide was described. Sulphonamides are often of value in treating vaginal infections following parturition in cows.

Many non-specific febrile conditions of horses can be treated with sulphonamides. Sulphonamides are of great value for topical application to accidental wounds in all animals. By dusting sulphonamides on operation wounds the chance of healing by first intention is greatly improved, but flank wounds in rumenotomy do not respond to sulphonamide treatment.—F. BOYLAND.

BRYAN, C. S., CUNKELMAN, J. W., YOUNG, F. W., & VISGER, E. E. (1946.) The treatment of acute infectious bovine mastitis with penicillin.—*Vet. Med.* 41. 94–98. 2125

Penicillin was used in the treatment of local mastitis in doses of 10,000–100,000 units per quarter at intervals of 12, 24 or 48 hours, until a decided

improvement was noticed. Where streptococci were the causal agents, treatment resulted in clinical, but not usually bacteriological cure. Where staphylococci were involved, there was usually bacteriological as well as clinical cure.

In the treatment of acute systemic mastitis, 200,000 units were given intravenously and 100,000 units were infused into the infected quarter or quarters. This treatment was repeated at 12- or 24-hourly intervals.

Further treatment with sulphanilamide given *per os*, instead of penicillin was as efficient as the repeated penicillin treatment. Two cows with streptococcal mastitis refractory to repeated penicillin treatment were cured by the infusion of tyrothricin into the infected quarter.—R. M. LOOSMORE.

BYRNE, J. L., PULLIN, J. W., & KONST, H. (1946.) Studies in infectious mastitis. I. Penicillin as a therapeutic agent.—*Canad. J. comp. Med.* 10. 16-23. 2126

266 quarters were treated with the sodium salt of penicillin. Of these, 179 were infected with *Streptococcus agalactiae*, 12 with *Str. dysgalactiae*, five with *Str. uberis*, 21 with unidentified streptococci and 49 with pathogenic staphylococci. The others showed only clinical and chemical manifestations of infection. From 1-6 treatments were given at intervals of four days. The number of Oxford Units ranged from 10,000 to 100,000 and the volumes of sterile saline from 25 to 250 ml. The best results, especially in streptococcal mastitis, were obtained with 40,000 units in 100 ml. of saline, recoveries in this group being 91%. Recovery occurred in 204 of 266 quarters after 1-3 treatments, and 38 failed to show improvement after six treatments, results being based on a complete bacteriological examination 1-2 months after treatment. Any plan for elimination of infection from a herd would have to make provision for the isolation or slaughter of animals which resist treatment, whether this was due to the strains becoming resistant to penicillin or not.—R. GWATKIN.

MURNANE, D. (1945.) A preliminary report on the treatment of clinical and subclinical streptococcal and staphylococcal infections of the bovine udder with penicillin.—*Aust. vet. J.* 21. 82-90. 2127

All classes of cows with naturally occurring streptococcal or staphylococcal mastitis of all degrees of severity in ten herds were treated according to varying dose schedules. No other measures were adopted and the possibility of reinfection was great because of the low standard of hygiene in the herds.

When 15,000 Oxford units of penicillin were infused into normal quarters, although absorption from the gland was rapid and dilution was great, particularly in cows in full milk, sufficient concentrations of the drug remained in the quarters up to 12 hours to inhibit most organisms. The infusion of penicillin after two successive milkings caused a transient fall of 13-37% in the milk yield in the subsequent 24 hours.

95 cases of clinical and 39 cases of subclinical mastitis were treated. Infection was eliminated in 72% of clinical cases of streptococcal mastitis after the infusion of two doses of penicillin at successive milkings and from 93% after six treatments. Indications are that 3-4 consecutive doses, each of 15,000 units, will generally be necessary. Staphylococcal infections failed to respond satisfactorily.—D. C. B.

ABELSON, L. C. (1946.) Anthrax treated with sulfa-diazine. Report of case.—*Bull. U.S. Army med. Dep.* 5. 363-364. 2128

An American soldier aged 28 had a circular lesion with vesicles which appeared to contain organisms with "the typical appearance of *Bacillus anthracis*". The patient was given an initial dose of 4 g. sulphadiazine followed by 2 g. every four hours and later 2.5 g. intravenously every six hours. He recovered in four days.—E. BOYLAND.

SWEANY, H. C., SHEER, B. C., & KLOECK, J. M. (1946.) Derivatives of p,p'-diaminodiphenylsulfone and sulfanilamide in experimental tuberculosis.—*Amer. Rev. Tuberc.* 53. 254-263. [Spanish summary.] [Authors' English summary slightly amended.] 2129

1. Three p,p'-diaminodiphenylsulfone derivatives and five sulfanilamide derivatives were selected from a series of *in vitro* tests for further tests in experimental tuberculosis.

2. Each of the p,p'-diaminodiphenylsulfone derivatives effectively retarded the tuberculous process in guinea pigs.

3. The sulphanilamide derivatives were non-effective although each received a high *in vitro* rating.

4. Compound 1048 [disodium salt of N,N'-bis-(β -carboxy- β -acetamido-ethylthiamethyl)-4,4'-diaminodiphenyl sulphone] was the most effective by tests *in vivo*.

5. The amount of tuberculous involvement varied between experiments and differed from that found by other observers. This is due to the characteristics of the inoculum and other factors resulting from the conditions imposed in our experiments.

SHEER, B. C., & KLOECK, J. M. (1946.) The combined action of p,p'-diaminodiphenylsulfone and immunization in experimental tuberculosis.—*Amer. Rev. Tuberc.* 53. 250-253. [Spanish summary.] [Authors' conclusions copied *verbatim*.] 2130

1. Controlled immunization produced moderate inhibition of the tuberculous process in guinea pigs.

2. P,p'-diaminodiphenylsulfone was more effective than immunization in the inhibition of the tuberculosis process.

3. The combined action of immunization and diaminodiphenylsulfone was no more effective than the drug alone. There was no significant difference between immunized and nonimmunized tuberculous guinea pigs when treated for two months with p,p'-diaminodiphenylsulfone.

WOODBINE, M. (1946.) Chemotherapy of *Erysipelothrix rhusiopathiae* infections in mice.—*Vet. J.* 102. 88-93. 2131

Seven strains of *E. rhusiopathiae* were tested *in vitro* and *in vivo* against a range of sulphonamides and penicillin. The organism was fast to sulphathiazole, sulphanilylguanidine, phthalylsulphathiazole, 3-sulphanilamidobenzamide and sulphatone [a sulphone type of drug] both *in vitro* and *in vivo*. It was sensitive *in vitro* to penicillin and benzylamine-4-sulphonamide, neither of which owe their mode of action to the reversal of p-aminobenzoic acid, indicating that the organism does not use this as a growth factor.

Benzylamine-4-sulphonamide has no systemic activity and was therefore not included in the *in vivo* tests.

Penicillin, even in doses of 100 Oxford units given morning and evening on six occasions, gave only a slight, temporary degree of protection, less than would be expected from the *in vitro* tests.

It is concluded that *E. rhusiopathiae* infection in swine will not prove amenable to penicillin therapy. [This is at variance with the experience of most workers, e.g., see "Penicillin", edited by Sir A. FLEMING. (1946.) pp. x + 380. London: Butterworth & Co.]—R. M. L.

POTH, E. J., KNOTTS, F. L., LEE, J. T., & INUI, F. (1942.) Bacteriostatic properties of sulfanilamide and some of its derivatives. I. Succinylsulfathiazole, a new chemotherapeutic agent locally active in the gastrointestinal tract.—*Arch. Surg., Chicago*. 44. 187-207. 2132

POTH, E. J., & ROSS, C. A. (1943.) Bacteriostatic properties of sulfanilamide and some of its derivatives: II. Phthalylsulfathiazole, a new chemotherapeutic agent locally active in the gastroenteric tract.—*Tex. Rep. Biol. Med.* 1. 345-370. 2133

POTH, E. J., & ROSS, C. A. (1945.) Bacteriostatic properties of sulphanilamide and some of its derivatives. III. The carboxysulfathiazoles as chemotherapeutic agents active in the gastrointestinal tract.—*J. Lab. clin. Med.* 30. 843-849. 2134

I. In this study the bacteriostatic activity was investigated of sulphanilamide and various derivatives, 18 drugs altogether, by oral administration to dogs. Succinylsulphanilamide and succinylsulphathiazole were found to have high bacteriostatic activity on the coliform organisms in the gastro-intestinal tract. These compounds possess the properties of acids and will liberate CO_2 from aqueous solutions of carbonates or bicarbonates. They have low toxicity and cause no tissue lesions after periods of seven and five weeks' dosages respectively of 1 g. per kg. daily. Succinylsulphathiazole is split in its passage through both man and dog to yield sulphathiazole. Hydrolysis occurs apparently in the liver.

II. In a continued search for an intestinal antiseptic which is sparingly absorbed from the gastro-intestinal tract and possesses strong antibacterial action locally, another sulphonamide, phthalylsulphathiazole was found. Dogs were used as the experimental animals and no evidence of toxicity appeared on oral administration of 0.083 g. per kg. every four hours for six weeks. With doses of 0.25 g. per kg. per day for three days, coliform organisms may be completely eliminated from the intestine.

Phthalylsulphathiazole (sulphathalidine) has a bacteriostatic effect 2-4 times that of succinylsulphathiazole (sulphasuxidine). The L.D.₅₀ of phthalylsulphathiazole on intraperitoneal administration in dogs is 2.5 g. per kg. Vomiting follows intravenous injection of 1 g. per kg. of the Na salt in 10% aqueous solution. Phthalylsulphathiazole is very sparingly soluble in water and is a weak acid. A suspension of the powder in an aqueous solution of NaHCO_3 liberates CO_2 slowly.

III. The study was extended to another series of sulphonamides, the carboxysulphathiazoles. These substances were found to possess relatively low toxicity and high antibacterial activity in the gastro-intestinal tract of the dog. Sulpha-4-carboxythiazole, sulpha-6-carboxythiazole, sulpha-4,5-dicarboxythiazole and sulpha-4-methyl-5-carboxymethylthiazole may prove to be useful therapeutic agents where it is desired to produce a general systemic effect as well as to alter the intestinal flora and maintain a relatively high concentration of the salt of a sulphonamide in the urinary tract.

—E. M. J.

WATT, J., & CUMMINS, S. D. (1945.) Studies of the acute diarrheal diseases. X D. Further studies on the relative efficacy of sulfonamides in shigellosis [human].—*Publ. Hlth Rep., Wash.* 60. 1355-1361. [Authors' summary copied verbatim.] [For part X C, see V. B. 16. 204.] 2135

Three sulfonamide preparations, sulfadiazine, sulfapyrazine, and sulfamethazine, were used in the treatment of 333 hospitalized cases of acute shigellosis. All three were therapeutically active in about the same degree in the treatment of these disorders. These

findings were similar to those reported for institutional groups in which the majority of the patients were asymptomatic carriers. Infections with *S. paradyseriae* Flexner as a rule responded promptly and completely, those with *S. sonnei* were more resistant to therapy. This was shown in both the results of stool culture and the case-fatality rates. Sulfadiazine and sulfapyrazine were relatively nontoxic, particularly when an alkaline urine was obtained promptly. Either of these drugs is recommended for therapy of shigellosis.

Sulfamethazine was active against the *Shigellae* but the number of toxic reactions of a systemic nature were sufficiently large to place this drug in the undesirable class.

HINSHAW, W. R., & McNEIL, E. (1946.) Experiments in the use of sulfathiazole for turkeys.—*Cornell Vet.* 36. 66-70. [Authors' summary copied verbatim.] 2136

Neither sulfathiazole nor sodium sulfathiazole has proven to be effective as a flock treatment for a respiratory disease of turkeys which is common on the West Coast, when given in doses readily accepted by the birds.

The drugs were also ineffective against two outbreaks of acute fowl typhoid of turkeys.

Blood levels in turkeys fed non-toxic and acceptable doses of the drugs (0.5 per cent in dry mash, 1-2000 in drinking water, and 0.5 gram twice daily for five-day periods) ranged from a trace to 4.0 mg. per cent with an average of 2.2 mg. per cent.

A deleterious effect on egg production was noted when adult turkeys were given an excess of 0.5 per cent sulfathiazole in the mash.

Feed containing sulfathiazole, and water containing sodium sulfathiazole, were unpalatable especially for young turkeys. Mash pellets containing sulfathiazole appeared to be more distasteful than dry mash containing the same level of the drug.

ABRAHAMS, I., & MILLER, J. K. (1946.) The *in vitro* action of sulfonamides and penicillin on actinomycetes.—*J. Bact.* 51. 145-148. [Authors' summary copied verbatim.] 2137

The ability of sulfathiazole, sulfadiazine, and penicillin to inhibit the *in vitro* growth of two strains of *Actinomyces* was studied. The sulfonamides, in 10 to 20 mg. per cent concentrations, exerted some growth-inhibiting effect. Penicillin prevented the growth of both strains in concentrations of 0.1 to 0.2 units per ml. of medium.

DRAKE, C. H. (1946.) The action of penicillin on several genera of the actinomycetales.—*J. Bact.* 51. 199-203. [Author's summary and conclusions copied verbatim.] 2138

Seventeen strains of *Streptomyces* were tested for sensitivity to penicillin by the filter paper disc method. Eight strains were inhibited by concentrations of 1,000 μ per ml. and of these only three were completely inhibited. Two strains showed partial inhibition by 100 μ per ml.

Five strains of *Nocardia asteroides* were tested in the same manner. Only one strain showed any inhibition at penicillin concentrations of 1,000 μ per ml. or less, and this partial inhibition was overcome in 48 hours.

One of the three strains of *Nocardia gypsoides* showed partial inhibition by 100 and 1,000 μ per ml., whereas the others were resistant to these concentrations of penicillin.

One strain of *Nocardia mexicana* was resistant to 1,000 μ per ml. but was partially inhibited by 10,000 μ per ml. concentration of penicillin.

Two strains of *Micromonospora* were partially inhibited by 100 and 1,000 μ per ml. of penicillin but not by lower concentrations.

THOM, C. (1945.) *Mycology presents penicillin*.—*Mycologia*. 37. 460-475. [Abst. in *Rev. appl. Mycol.* 24. 463, copied *verbatim*.] 2139

The author traces the mycological history of the discovery and development of penicillin up to the present time, when in the United States alone \$20,000,000 is reported to be invested in industrial plants with a reputed production of 100 billions of Oxford units of penicillin per month by workers most of whom were totally unacquainted at the start with the mould problems involved.

CUTTING, W. C., LUDUEÑA, F. P., FIESE, M., ELLIOTT, H. W., & FIELD, J., II. (1945.) *Distribution and fate of penicillin in the body*.—*J. Pharmacol.* 85. 36-41. 2140

Penicillin injected into rats, rabbits or dogs is widely distributed in the tissues, except for the nervous system. It is excreted in bile, but not in saliva. Biliary obstruction did not reduce the rate of disappearance of penicillin from the blood, but renal obstruction delayed the fall in blood concentration. As penicillin is not destroyed by blood, excretion must account for the fall in concentration which occurs.—E. BOYLAND.

NORTH, E. A., & CHRISTIE, R. (1945.) *Observations on the sensitivity of staphylococci to penicillin*.—*Med. J. Aust.* July 14th. 44-47. 2141

This work was undertaken to ascertain whether the presence or absence of any of the commoner properties of staphylococci would show correlation with the degree of their sensitivity to penicillin. 159 strains of staphylococci were examined, but no correlation was found between resistance and other biochemical properties. The only strains showing resistance to penicillin came from patients in wards where penicillin treatment had been given. In other respects these were similar to normal strains.—N. W.

PARKER, R. F., & MARSH, H. C. (1946.) *The action of penicillin on staphylococcus*.—*J. Bact.* 51. 181-186. [Authors' conclusions copied *verbatim*.] 2142

At low penicillin concentrations, the lethal action of the antibiotic agent on *Staphylococcus* is preceded by a period of unaffected growth. At higher concentration the lethal action appears to begin without lag.

After removal of the bacterial cells to a penicillin-free medium, the effect of penicillin persists for a time. When *Staphylococcus* is exposed to 1 unit of penicillin per ml. of culture medium, death of bacteria continues for a time after removal of the penicillin, and after a period of some 3 hours, growth is resumed. At lower concentrations of penicillin, exposure for a comparable time may lead to no deaths, but growth is inhibited for 3 hours after removal of the drug.

BONDI, A., JR., & DIETZ, C. C. (1945.) *Penicillin resistant staphylococci*.—*Proc. Soc. exp. Biol., N.Y.* 60. 55-58. 2143

Of 115 strains of staphylococci tested, 16 were resistant to penicillin. All resistant strains produced penicillinase, while penicillinase was not produced by any of the susceptible strains. Resistant strains appear to depend upon penicillinase for their resistance.

—E. BOYLAND.

DUTHIE, E. S. (1944.) *The production of penicillinase by organisms of the subtilis group*.—*Brit. J. exp. Path.* 25. 96-100. 2144

Stable preparations of penicillinase can be produced by growing organisms of the *Bacillus subtilis*

group on liquid media and adding penicillin at the end of the growth phase. The activity of the preparations was determined by comparing the effect with that of a standard preparation of the enzymes.

—E. BOYLAND.

ROBINSON, H. J., GRAESSLE, O. E., GUNDEL, M., & SILBER, R. H. (1946.) *Pharmacological studies on streptothricin*.—*J. Pharmacol.* 86. 22-36. 2145

Crude streptothricin is toxic to the extent that the administration of 5-10 times the therapeutic dose causes death of animals.

Two toxic factors are present, one with a histamine-like action, which does not seem to be histamine, and another which has a delayed toxic action on the kidney. The factor causing renal damage appears to be related to the active principle. High concentrations of streptothricin applied to the eye cause an inflammatory reaction. Streptothricin is rapidly absorbed and excreted.—E. BOYLAND.

MOLLITOR, H., GRAESSLE, O. E., KUNA, S., MUSHETT, C. W., & SILBER, R. H. (1946.) *Some toxicological and pharmacological properties of streptomycin*.—*J. Pharmacol.* 86. 151-173. 2146

Streptomycin contains toxic impurities, one of which has histamine-like properties, while a second causes restlessness, respiratory distress, coma and respiratory failure. No pathological lesions occurred when acutely toxic doses were given. Continuous administration of streptomycin to young rats induced nervous hyper-excitability and retarded growth. Dogs and monkeys exhibited impairment of hepatic and renal function but such changes were reversible. Even purified streptomycin, which is free from the histamine-like material, causes a prolonged depression of blood pressure on intravenous injection. Injection of impure streptomycin has an antidiuretic effect which is not produced by the pure material. Streptomycin causes a relaxation of the isolated rabbit intestine and g. pig uterus.—E. BOYLAND.

EMERSON, G. A., & SMITH, D. G. (1945.) *Induction of nutritional deficiency by oral administration of streptomycin*.—*J. Pharmacol.* 85. 336-342. 2147

By feeding rats high doses of streptomycin, symptoms were induced which resembled experimental biotin deficiency and which could be relieved by the administration of biotin. The effect on the coliform organisms of the gut was similar to but greater than that produced by sulphonamides. It is suggested that streptomycin may be of use for temporary sterilization of the gastro-intestinal tract.

—E. BOYLAND.

SMITH, D. G., ROBINSON, H. J., & CLARK, D. M. (1945.) *The influence of streptomycin and streptothricin on the intestinal flora of mice*.—*J. Bact.* 50. 613-621. [Authors' summary copied *verbatim*.] 2148

Streptothricin and especially streptomycin, when fed to mice in their diet, produced a very rapid and pronounced reduction in the numbers of both the coliform and the non-lactose-fermenting organisms in the feces.

The dose of streptothricin required for effective reduction was one-half the toxic dose. The dose of streptomycin required, however, was much below the toxic dose and maintained the reduced number of organisms as long as therapy was continued.

Both drugs produced a distinct change in the intestinal flora but did not appear to stimulate the development of resistance.

MORTON, H. E., KOCHOLATY, W., JUNOWICZ-

KOCHOLATY, R., & KELNER, A. (1945.) Toxicity and antibiotic activity of kojic acid produced by *Aspergillus luteo-virescens*.—*J. Bact.* 50. 579-584. [Authors' summary slightly amended.] 2149

The isolation of kojic acid from a culture of *Aspergillus luteo-virescens* is reported. The M.L.D. of kojic acid for 17-g. mice injected intraperitoneally is about 30 mg. per mouse.

The inhibitory concentration of kojic acid when dissolved in nutrient agar was tested against 166 strains of bacteria. Two species of *Leptospira* were especially susceptible to the action of kojic acid. In view of the susceptibility of these organisms to the action of other antibiotics, *in vivo* tests were not made.

NUTINI, L. G., & LYNCH, E. M. (1945.) Effect of tissue extracts in controlling *Staphylococcus aureus* infections. [Correspondence].—*Nature, Lond.* 156. 419-420. 2150

A factor extracted from ox brain, spleen, heart or kidney tissue has the power to alter the characters of *Staph. aureus in vitro*. When such altered strains are inoculated into mice they have a lower virulence than a normal strain. The tissue extract exerts a marked prophylactic and therapeutic action against experimental infection with *Staph. aureus* in mice.—B. WEITZ.

VALLÉE, M. (1945.) Action antimicrobienne et antitoxique de *B. subtilis* sur les bactéries pathogènes. [The antibacterial action of *B. subtilis*.]—*Rec. Méd. vét.* 121. 273-277. 2151

In 1897 METCHNIKOFF noticed that cultures of *Bacillus subtilis* or *B. mesentericus* were able to inactivate tetanus toxin, but the conditions for the production and isolation of the subtilin [subtilin] were not known until 1944. The antibiotic is produced in young cultures, but maximum yields are obtained if the cultures are allowed to autolyse after growth in aerated media. Subtilin is destroyed at 80° C. and must be separated from the organisms by filtration and precipitation with alkaline calcium chloride. The precipitated and dried product is stable over a period of many months. Subtilin is not inactivated by formalin and inhibits the growth of *Bacterium coli*, *Brucella abortus* and *Clostridium oedematis*. Cultures of *B. subtilis* can be used as such in the treatment of enteritis.—E. BOYLAND.

RICHOU, R. (1946.) Propriétés antagonistes des filtrats de culture de *Bacillus subtilis* à l'égard du bacille de Preisz-Nocard et de sa toxine. [Antibiotic action of filtrates of *B. subtilis* on *Corynebacterium ovis*.]—*Bull. Acad. vét. Fr.* 19. 47-51. 2152

Filtrates from cultures of *B. subtilis* are not only able to inhibit the growth of *Corynebacterium ovis* but can destroy the toxin of this organism. The antibiotic subtilin is heat-stable, remaining active after heating to 125° C. for 20 min. [but see preceding abst.] and is not inactivated by 0.1% formalin. The material inactivates diphtheria, tetanus and staphylococcal toxins and prevents the growth of *Corynebacterium diphtheriae* and *Pasteurella pestis*. It is suggested that the substance should be of value in treatment of lymphangitis in horses and other veterinary diseases.—E. BOYLAND.

FARR, M. M., & WEHR, E. E. (1945.) Sulfamerazine therapy in experimental caecal coccidiosis of chickens. —*J. Parasit.* 31. 353-358. 2153

Mortality from caecal coccidiosis was reduced when sulphamerazine was administered in the mash in a concentration of 1%; this dose, however, proved toxic as was indicated by retarded weight gains and spleen

and liver lesions. 0.25% sulphamerazine in the mash proved to be an effective prophylactic when fed within two days after infection and the toxic symptoms were much less pronounced. Clinical coccidiosis developed within 4-6 days after the cessation of treatment with 1% sulphamerazine, administered before or within one day after infection.—C. HORTON SMITH.

WEHR, E. E., & FARR, M. M. (1945.) Effect of sulfaquandine on the course of infection in chickens with *Eimeria tenella*.—*J. Parasit.* 31. 359-365. 2154

The authors showed that 0.5% sulphaquandine in the mash fed for seven consecutive days to chickens infected with *E. tenella* was beneficial when the treatment was begun one day before or within two days after experimental infection. A higher level of medication, i.e., 1.2% in the mash administered for seven days, prevented deaths among groups of birds which received treatment beginning one day before, on the day of and one day after infection. It was found that the administration of this mash even on the third day of infection reduced mortality.—C. HORTON SMITH.

SWALES, W. E. (1946.) On the chemotherapy of caecal coccidiosis (*Eimeria tenella*) of chickens. II. Further studies on the use of drugs in established infections.—*Canad. J. comp. Med.* 10. 3-13. [French summary.] [For previous article, see V. B. 15. 310.] 2155

Continued experiments supported the previous findings that sulphamerazine and its sodium salt are strongly coccidiostatic and will check the disease when administered soon after bleeding is first noticed. The dimethyl and unmethylated counterparts, sulphamethazine and sulphadiazine, are also coccidiostatic, but the fully methylated drug, 2-sulphanilamido-4,5,6-trimethylpyrimidine and the 2-sulphanilamido-4,5-dimethylpyrimidine were found to be inactive. Other chemicals related only through the pyrimidine structure showed no coccidiostatic effect. 2 g. sulphamerazine per lb. of feed or 2 g. of its sodium salt per litre of drinking water should be used for three days as soon as bleeding is evident. A commercial preparation of sulphamerazine was equally effective when the dosage was increased to allow for the administration of the same amount of sulphamerazine. Haemoglobin determinations were a valuable indicator of the extent of the disease and the effect of the drugs. No toxic effect followed the indicated dosage.—R. GWATKIN.

ANON. (1946.) Chemical constitution of paludrine.—*Brit. med. J.* May 18th. 767-768. 2156

Paludrine is N_1 -p-chlorophenyl- N_2 -isopropyl biguanide. The molecule has a benzene ring linked to an isopropylamino group $\left(\begin{array}{c} \text{—NH—CH} \begin{array}{l} \text{CH}_3 \\ \text{CH}_2 \end{array} \end{array} \right)$ through two amidine groups $\left(\begin{array}{c} \text{—NH—C—} \\ \parallel \\ \text{—N—} \end{array} \right)$ joined

“in series”.

A characteristic of the amidine group is its capacity to be involved in resonance, i.e., for electrons to move from one N atom to the other and back again, with a consequent displacement of electrical charge and the appropriate shift of the double bond. Like mepacrine, paludrine is a strong base, forms stable salts with acids, contains a chlorine-substituted benzene ring and carries alkyl groups attached to N. After extensive research involving the study of more than a thousand chemical compounds, the highest antimalarial activity was ultimately found in the preparation now known as paludrine.—E. M. J.

BENDIXEN, H. C. (1944.) Om Fentiazinets Anven-

delse i veterinaer Praksis. [Use of phenothiazine in veterinary practice.]—*Maanedsskr. Dyrlæger.* 56. 417-442. 2157

This is a detailed description of the first use of phenothiazine in Denmark, comprising trials on a few parasitized sheep and cattle sent to the veterinary school at Copenhagen and numerous instances of treatment in the field. Results conformed to the world-wide experiences with this drug and no novel point emerges. In a supplementary note it is reported that some 50 horses had been successfully treated without toxic effects although the doses used were very high (100 g. for a large horse down to 50 g. for a foal).

Coccidiosis in calves is also reported to have been favourably influenced by phenothiazine in dosage of 0.5 g. per kg., which was the amount generally used in sheep and cattle.—J. E.

DESCHIEENS, R. (1944.) Etude d'un test de détermination des propriétés anthelmintiques des dérivés triphénylméthaniques. [A technique for assaying the anthelmintic properties of drugs.]—*C. R. Soc. Biol. Paris.* 138. 201-202. 2158

Using a technique described in a previous article [see *V. B.* 16. 58], drugs were tested *in vitro* against *Rhabditis macrocerca* and the larvae of *Haemonchus contortus* and *in vivo* against the mouse oxyurids, *Aspicularis tetraptera* and *Syphacia obvelata*. Basic fuchsin, acid fuchsin, neutral fuchsin, crystal violet, gentian violet, methyl green, malachite green, methyl blue, light green and brilliant green were the drugs tested. 1:300 solutions of the drugs were used in the *in vitro* tests and for the *in vivo* test a 1:2,000 solution was given by mouth at a dosage rate of 0.75 ml. for a 20 g. mouse for 8-10 consecutive days. Basic fuchsin, neutral fuchsin, crystal violet and gentian violet all killed the *Rhabditis* in less than 48 hours and the *Haemonchus* larvae in less than six hours. No oxyurids were found P.M. in the mice to which these drugs had been given. Methyl violet and malachite green killed the *Rhabditis* in less than 72 hours and the *Haemonchus* larvae in less than 24 hours; oxyurids were not found P.M. in the mice to which these drugs had been administered. When methyl blue and light green were tested *in vitro* the *Rhabditis* were alive after 72 hours and the *Haemonchus* larvae after 24 hours, and oxyurids were found in the mice to which these drugs had been given when they were examined P.M. Acid fuchsin did not kill *Rhabditis macrocerca* after 72 hours but killed *Haemonchus* larvae after 24 hours; oxyurids were found P.M. in mice receiving the drug. Brilliant green killed the *Rhabditis* in less than 72 hours and the *Haemonchus* larvae in less than six hours, and there were no oxyurids present at autopsy in the mice which had received this drug.

D. suggests that the rabbit would be a suitable animal upon which to test the toxicity of anthelmintic drugs, since it is easy to administer continued doses of drugs in pill form to rabbits and their toxic reactions are similar to those of man.—T. E. GIBSON.

GIBSON, T. E. (1945.) The effect of small repeated doses of phenothiazine on strongylid infestation in the horse.—*Vet. Rec.* 57. 301-303. 2159

Five horses, given 1 g. phenothiazine daily for 30 days did not eliminate their strongyles, but there was a fall in the faecal egg count to a very low level or to zero, attributable to the inhibition by the drug of egg production of the nematodes. On four occasions this inhibition was prolonged for as long as five weeks after the last dose of phenothiazine had been given, making a total of some eight weeks

throughout which egg production by the worms was almost completely inhibited. In the fifth case a slight increase in the egg count occurred 12 days after treatment ceased. While phenothiazine was being administered to the animals, the worm eggs passed in their faeces could not develop into infective larvae. G. points out that if the non-toxicity of small doses of phenothiazine repeated daily for long periods is demonstrated under varying farming conditions, the method of administration of the drug should prove of great value in the control of equine strongylosis preventing pasture contamination.—J. N. OLDFHAM.

SPRENT, J. F. A. (1946.) Critical anthelmintic tests in cattle.—*Vet. J.* 102. 83-87. 2160

Phenothiazine, gentian violet, copper sulphate and sodium arsenite, copper sulphate, sodium arsenite and tobacco extract, thymol, potassium antimony tartrate, brilliant green, tetrachlorethylene, carbon tetrachloride, and oil of chenopodium were tested against *Haemonchus contortus*, *Bunostomum phlebotomum* and *Oesophagostomum radiatum* infestations in zebu cattle in Nigeria, using Hall's critical test and one animal being used for testing each drug. A low or zero efficiency was recorded for all drugs except phenothiazine which was 100% efficient against *Haemonchus* and 90% efficient against *O. radiatum*. S. discusses these results and compares them with the findings of other authors, concluding that phenothiazine is the most satisfactory drug for use against *Haemonchus* and *Oesophagostomum* infestations in the zebu. He recommends a 50 g. dose for an animal weighing 120 kg. The treatment for *Bunostomum* infestation is uncertain: phenothiazine gave poor results in the trial, but other authors report favourable results when the drug is given at a dosage rate of 0.7-1.1 g. per kg. body weight. It is pointed out that such high doses might be toxic to the zebu calf. Distol [male fern extract] has been reported by several authors as effective against *Bunostomum* and S. states that this will probably prove to be the drug of choice for the treatment of bunostomiasis.

—T. E. GIBSON.

HAERMAN, R. T., ENZIE, F. D., & FOSTER, A. O. (1945.) Tests with fluorides, especially sodium fluoride, as anthelmintics for swine.—*Amer. J. vet. Res.* 6. 131-144. 2161

Sodium fluoride given to pigs as 1% of the feed on three successive days removed 97% of ascarids and lower percentages of stomach worms, nodular worms and whipworms. When it was given as 2% 1.5%, or 1% of the feed for one day only, equally good ascariocidal results were shown. The authors conclude that a dose of 1% of the feed for one day is the optimum, the rate of dosage being approximately 0.13 g. per lb. body weight. The drug was taken well, the only abnormal signs being vomiting in a few cases, and softening of the faeces. Even when the pigs vomited from eating the mash containing the fluoride, they continued to eat it. In all the above experiments, only four pigs died out of 124 used and in only one of these was death attributable to sodium fluoride poisoning. In tests for toxicity, concentrations of 4-5% of the feed were highly dangerous. It is pointed out that the danger of a pig taking too much from a mash of lower concentration is offset by the early vomiting. Horses, goats, sheep, chickens and dogs appeared to be relatively tolerant to the drug; it had little anthelmintic action, except on *Parascaris* and *Oxyuris* in horses.

Aluminium fluoride, barium fluoride, aluminium silicofluoride, sodium aluminium fluoride and sodium silicofluoride all proved much less effective a

the mints, presumably due to the lack of available fluorine. Mixtures of sodium fluoride and phenothiazine were effective against ascarids, but less so against the other worms than was sodium fluoride alone. The mixture was very unpalatable.—R. M. L.

AWTON, A. H., BRADY, F. J., NESS, A. T., & HASKINS, W. T. (1945.) Tests of mercury and antimony compounds in *Dirofilaria immitis* and *Litomosoides carinii* infections.—*Amer. J. trop. Med.* 25: 263-268.

Treatment of dogs with trivalent antimony compounds at a dosage rate of 0.8 mg. antimony per kg. body weight eliminated microfilariae from the peripheral circulation in 28 out of 29 cases. Sixteen different antimony compounds were used and all were effective and safe. Of previously untried compounds, *p*-phenetidine antimonyl tartrate, sodium antimonyl xylitol, sodium antimonyl 2,5 methylene-mannitol, sodium antimonyl adonitol, and sodium antimonyl erythritol appeared to be the most promising, although the three last named are relatively unstable in solution. Cyanide, oxycyanide, and acetonimide of mercury did not kill microfilariae or adult *D. immitis* in dogs.—G. B. S. HEATH.

ULBERTSON, J. T., ROSE, H. M., & OLIVER-GONZALEZ, J. (1946.) Chemotherapy of filariasis due to *Wuchereria bancrofti* with neostibosan.—*Amer. J. Hyg.* 43: 145-151. [Authors' summary copied verbatim.]

Of 35 patients with filariasis due to *Wuchereria bancrofti* who were treated with neostibosan, 20 were apparently entirely cured of the infection, as shown by their loss of all microfilariae, during the period of observation (5 to 15 months). Ten others lost more than 80 per cent of their circulating microfilariae and appeared likely to lose the remainder within a few additional months. In 5 of the 35 treated persons, administration of the drug evidently failed significantly to affect the infection. Fifteen control untreated patients were all still infected after observation from 4 to 17 months.

Neostibosan appears to act chiefly upon the adult phase of the worm rather than on the embryos in the blood, although once the adults are killed the embryos gradually decline in number.

The immediate reactions of patients to neostibosan, as used, were slight, consisting chiefly of nausea and vomiting. Usually patients acquired tolerance for the drug within the first several days of its administration. In no case was it necessary to stop the drug because of toxicity.

In no patient were symptoms suggestive of nephritis induced by chemotherapy.

ÖLL, A. (1944.) Behandlung der erkrankten Gebärmutter des Rindes mit Surfen-Jod. [Treatment of metritis with surfen-iodine mixture].—*Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* 52/50: 103-105.

The use of a mixture of 2% surfen (bis-2-ethyl-4-amino-quinolyl-6-carbamide hydrochloride) and 5% tincture of iodine for uterine irrigation in the treatment of metritis is described. Of 47 cows with metritis of the first degree, 41 responded to treatment and became pregnant; of 129 cases with metritis of the second degree, 100 became pregnant and of 38 with metritis of the third degree 24 became pregnant after treatment.—ALFRED T. COWIE.

RAVASSOS, J., & BROCCA, E. (1942.) Ação da prata eletrólizada sobre certas toxinas, venenos, protozoários, rickettsias, vírus filtráveis e bacteriófagos. (Nota prévia.) [Action of electrolysed silver on

certain toxins, venoms, protozoa, rickettsias, viruses and phages. Preliminary note.]—*Mem. Inst. Butantan.* 16: 309-314. [English summary.]

This preliminary paper deals with the action of minute amounts of silver produced within an electro-katadyne apparatus on certain toxins, venoms, protozoa, rickettsia, filtrable viruses and bacteriophages.

[The electro-katadyne apparatus consists of a dry battery connected to two silver electrodes. When the electrodes are immersed in water small amounts of silver are given off into the water. This silver is in the form of an unstable compound which ionizes freely. The bactericidal properties of water treated with electro-katadyne depend upon the pH, the presence of other ionizable chemical substances, the temperature, and the amount of ionizable silver which has passed into solution.]

Under experimental conditions where the solution contained a suitable concentration of NaCl the action of the electrolysed silver on trypanosomes and leishmania was noted within a few minutes by their immobilization.

The diphtheria and tetanus toxins as well as the venoms of *Bothrops jararaca* and *Crotalus terrificus* were resistant to the action and a similar resistance was noted with the spotted fever rickettsia, the vaccine virus and bacteriophages of intestinal bacteria. On account of the fact that the vaccine virus was still active for the rabbit, two months after the treatment, and of the powerful bactericidal action, the authors suggest this method for the purification of vaccine lymph and other viruses.—E. M. J.

*SIEDEL, F. (1940.) Therapeutische Versuche mit Oleum Terebinthinae intravenös bei den katarhalischen Erkrankungen der oberen Luftwege des Pferdes. [Therapeutic experiments with oleum terebinthinae (intravenous) in catarrhal infections of the upper respiratory tract of the horse.]—*Inaug. Diss., Hannover.* [Abst. from abst. in *Berl. Münch. tierärztl. Wschr./Wien. tierärztl. Mschr.* August 20th, 283, (1943).]

Beneficial results were obtained by the intravenous injection of 3 ml. of ol. terebinth. in horses with catarrhal infections of the upper respiratory tract. Doses of 5 ml. produced dyspnoea, colic and in some cases, death. Ol. terebinth. was useless in cases where abscess formation in the lymph nodes had occurred.—A. T. PHILLIPSON.

GILMAN, A., & PHILIPS, F. S. (1946.) The biological actions and therapeutic applications of the B-chloroethyl amines and sulfides.—*Science.* 103: 409-415 & 436.

The B-chloroethyl amines or "nitrogen mustards" such as methyl bis (B-chloroethyl) amine react in water to give cyclic imonium compounds. This reaction and the hydrolysis to inert compounds are inhibited by acid while mustard gas bis (B-chloroethyl) sulphide hydrolyses to inert compounds under the same conditions. Both types of compound have a cytotoxic action, particularly on the cells of the blood-forming organs and intestinal tract. The toxicity and leucotoxic action of the compounds vary with the reactivity of the onium ions and the rate of cyclization of the parent B-chloroethyl. Enzymes of the phosphokinase type are readily inactivated by both nitrogenous vesicants and mustard gas. The vesicants have nucleotoxic action inhibiting mitosis, causing nuclear damage and reducing fertility. The

vesicants have inhibitory effects on lymphoid tissue and the nitrogen mustards have been used in treatment of cancer of lymphoid tissues. Palliative effects were obtained in treatment of cases of lymphosarcoma and Hodgkin's disease. Disappointing results were found in the treatment of cases of lymphogenous and myelogenous leucaemias.—E. BOYLAND.

PATERSON, E., THOMAS, I. A., HADDOW, A., & WATKINSON, J. M. (1946.) *Leukaemia treated with urethane compared with deep X-ray therapy [human].—Lancet.* 250. 677-682 & 683. 2168

The treatment of cases of leukaemia with urethane (ethyl carbamate) causes a fall in the total white-cell count to normal limits, a tendency for the differential count to approach a more normal pattern, a diminution of the size of the spleen and enlarged lymph nodes, and a rise in haemoglobin. These effects are similar to those produced by deep X-ray therapy. There is, however, no definite evidence that the treatment causes permanent benefit, as relapses occur. Slight diminution in size occurred in seven out of 20 cases of cancer treated with urethane.—E. BOYLAND.

NAUTS, H. C., SWIFT, W. E., & COLEY, B. L. (1946.) The treatment of malignant tumors by bacterial toxins as developed by the late William B. Coley, M.D., reviewed in the light of modern research.—*Cancer Res.* 6. 205-216. [Authors' summary copied *verbatim*.] 2169

This study provides sufficient evidence, both clinical and experimental, to justify the conclusion that toxin therapy has clinical value, and that further extensive research is warranted in order to produce better preparations and further refinements in the technique of administration. Reasons are given to explain why the method has not achieved wider recognition in the past.

FELL, E. H., & HANSELMAN, R. (1943.) Prevention of shock and death by immediate application of a pressure dressing to the severely frozen limbs of dogs. An experimental study.—*Ann. Surg.* 117. 686-691. 2170

Pressure dressings consisting of plaster encasements were applied to five out of ten dogs whose right hind extremities had been frozen at -55°C. for 20 min. by immersion in a mixture of CO₂ snow and 95% alcohol. All five of the untreated dogs, whose legs were allowed to thaw out at room temperature, developed clinical shock, four of them dying within 13 hours. All of the treated dogs lived, although four developed necrotic limbs necessitating amputation and one died nine days after freezing from a secondary infection. It is of interest that the encased limbs thawed out very slowly and were cold and moist for 12 hours or longer.—R. ALLCROFT.

FREED, S. C., KRUGER, H. E., & PRINZMETAL, M. (1944.) Further studies on the role of bacteria in shock due to crushed muscle in dogs.—*Surgery.* 16. 914-922. [Abst. in *Bull. War Med.* 5. 638, copied *verbatim*. Signed: GEOFFREY DAWES.] 2171

In a previous publication a technique was reported by which shock could be regularly produced in dogs by crushing a known amount of muscle with minimal blood loss. This manifestation of shock was a direct result of bacterial action, for in spite of aseptic precautions, the crushed muscle was found to be grossly contaminated. Untreated animals were obviously in shock at the end of 24 hours, and there was some decrease of circulating blood volume (though the local fluid loss was insufficient to account completely for the symptoms), whereas animals to which sulphamerazine was administered locally and systemically remained in

excellent condition. It was therefore concluded that this was an example of toxic shock, as distinguished from "extravasative shock" induced by trauma or burns.

The present paper confirms the previous findings, for 50 out of 52 untreated or inadequately-treated animals died, whereas none out of 50 dogs which received adequate doses of antibacterial agents died. Local treatment alone afforded incomplete protection, for 2 out of 11 dogs died when the crushed muscle was mixed with 0.5 gm. of sodium sulphamerazine per 10 gm. of muscle before reinsertion; the absorption from this local deposit was very poor. Systemic administration of sulphamerazine (sufficient to maintain a blood concentration of from 9-20 mgm. per cent.) immediately, or within six hours after operation, was completely effective in preventing the development of shock in 10 dogs. But if the treatment with sulphamerazine was delayed for 17 hours, it was only partially effective; while dogs which were not treated until 24 hours afterwards all developed the symptoms of shock and 5 out of 11 died.

Similarly, in their previous paper the authors showed that if the crushed muscle was removed at a further operation within 4-17 hours, shock did not develop, whereas when this treatment was delayed for 24 hours, four out of five dogs died.

Analysis of the crushed muscle after systemic administration of sulphamerazine produced the unexpected finding that in 22 out of 24 instances the concentration of the drug was higher in the crushed muscle than in the normal muscle of the same animal.

So far as these results are applicable to wounded patients, the authors recommend that following early "débridement" sulphamerazine should be administered both locally and systemically, and that the drug should be continued for several days in adequate amounts.

VALKO, E. I., & DuBOIS, A. S. (1945.) Correlation between antibacterial power and chemical structure of higher alkyl ammonium ions.—*J. Bact.* 50. 481-490. [Authors' summary copied *verbatim*.] 2172

The germicidal activity, against *Staphylococcus aureus* and *Escherichia typhi*, of the following compounds was determined: halides of normal primary higher aliphatic amines; their tertiary dimethyl derivatives; quaternary methyl, ethyl, allyl, and benzyl derivatives of these tertiary amines; a few closely related ammonium halides.

It was found that the effect of the chain length of the higher aliphatic radical and that of the nature of the lower alkyl substituent on the germicidal activity are interdependent.

In many cases, the *n*-9-octadecenyl derivatives exhibited a superior anti-bacterial efficacy, as compared with the corresponding *n*-octadecyl derivatives.

GOTTSACKER, E. (1942.) Was dürfen wir von Zephrol bei der Händedesinfektion erwarten? [What is to be expected of zephrol in disinfection of the hands?]—*Arch. Hyg., Berl.* 128. 11-30. [Abst. in *Bull. Hyg., Lond.* 19. 965-966, slightly amended. Signed: L. P. GARROD.] 2173

This paper is a critical review of published data on the action of Zephrol [a quaternary ammonium salt] in disinfecting the skin, with an account of various experiments performed by the author himself. He ranks the merits of Zephrol higher than some others have done, and disputes certain of their unfavourable conclusions. Particular emphasis is laid on the persistence of its action: a finger disinfected with Zephrol, dried and then lightly applied to an inoculated agar plate will prevent subsequent growth in the area with which it

has made contact; hands so disinfected will sterilize the interior of a rubber glove into which 1 c.c. of undiluted broth culture of staphylococci or pneumococci has been introduced. These and other experiments are recounted with insufficient detail for their full validity

See also absts. 1937 (therapy of TB.) 1977 (of avian coccidiosis), 1985 (of canine leptospirosis), 2023, 2192 (of blowfly strike), 2119 (D.D.T., gammexane), 2192 (anthelmintics), 2115 (antitoxic action of manganese), 1948, 2186 (penicillin), 2013, 2014 (bacteriophage therapy), 1968-1970 (disinfection), 2100, 2101 (influence of copper salts in medication of sheep), 2199 (antibiotics), 2200 (materia medica).

HYGIENE, PUBLIC HEALTH AND VETERINARY SERVICES

TOPLEY, E. (1945.) 'An outbreak of vomiting apparently due to milk.—*Mon. Bull. Min. Hlth emerg. publ. Hlth Lab. Serv.* 4. 128-130. 2174

In August, 1944, 97 persons are known to have suffered from acute vomiting 2½-5 hours after drinking milk. The attacks lasted a few hours and no after-effects or serious systemic symptoms were noted. Milk from one particular farm appeared to cause the outbreak, but the nature of the agent in the milk was not discovered. The milk contained large numbers of *Streptococcus lactis* and another organism resembling *Str. faecalis*. Both these were also found in milk from the affected quarter of a cow with mastitis on the same farm. The unknown streptococcus was α-haemolytic and grew in short chains. It did not fall into any of the serological groups A, B, C, or G.

Details of the investigation are given and the outbreak compared with similar ones described by CASEY *et al.* [(1931) *Proc. Soc. exp. Biol.*, N.Y. 29. 214, and (1938) *J. infect. Dis.* 62. 88], which were traced to meat and sausages containing streptococci.—C. M. F.

STURA, C. A. (1944.) 'Caracteres morfológicos y tintoriales de los gérmenes patógenos y saprófitos que se pueden encontrar en las carnes, en las conservas y en los embutidos. [Morphological and staining characteristics of pathogenic and saprophytic organisms present in meat and meat products].—*Gac. vet., B. Aires.* 6. 13-47 & 72-93. 2175

Continuing his study [V.B. 16. 249] of the bacteria found in meat and meat products, S. lists the morphological, cultural and biochemical characters of the numerous bacteria mentioned in the previous article. [There is a photomicrograph of each organism.]—I. W. JENNINGS.

GINSBERG, A. (1945.) The action of three different bacon-brines on pathogenic bacteria.—*Vet. J.* 101. 123-131. 2176

On the assumption that bacon brine is not strong enough to kill micro-organisms invading meat during the animal's life, during the dressing of the carcass or during the preparation of the flesh, a special study of the action on pathogenic bacteria of three different curing brines was carried out.

The experiments dealt with the action on *Staphylococcus aureus*, *Salmonella typhi-murium*, *S. reading*, *S. enteritidis*, *Proteus vulgaris* and *Chromobacterium prodigiosum* of normal bacon brine, bacon-brine plus 0.6% borax, and bacon-brine in which saltpetre was replaced by 0.6% sodium nitrite. The methods and curing times were similar to those obtaining in the meat production trade and experiments were made with both infected brine solutions and inoculated pieces of meat.

Results showed that pickling is useless as a means of rendering infected meat fit for human consumption owing to the length of time which elapses before the organisms are killed; the disinfectant action of the brines on pathogenic bacteria is slight.

Both the pickling process and the bactericidal action are hastened if saltpetre is replaced by sodium nitrite.

—H. E. BYWATER.

to be accepted; although mention is made, for instance, of the need for neutralizing fluid from the interior of gloves with soap before cultivating it, a suspicion remains that apparent disinfection may sometimes have been due to the "carry-over" of antiseptic into the culture.

MACDONALD, A. (1944.) Staphylococcal food poisoning caused by cheese.—*Mon. Bull. Min. Hlth emerg. publ. Hlth Lab. Serv.* 3. 121-122. 2177

Four people out of five were taken ill with food poisoning after having partaken of a meal which included cheese made from goat's milk. The fifth person, who escaped illness, had not eaten cheese.

Investigation of the patients and foodstuffs consumed was undertaken. Throat, nose and hand swabs and specimens of faeces were obtained but no vomit specimens had been kept. No organisms of the salmonella, dysentery and enteric groups were found but *Staphylococcus aureus* was isolated from the faeces of one patient. The cheese seemed the most likely source of infection and the remainder was examined: four samples gave counts of 18, 24, 36 and 24 million *Staph. aureus* respectively per gramme.

Examination of those engaged in milking or cheese-making failed to reveal *Staph. aureus* and no lesions of the udder or teats of the goats were found. Freshly drawn milk from one goat, however, revealed 200 organisms per ml.

Three strains of *Staph. aureus* from the cheese, goat's milk and faeces of one patient gave the same biochemical reactions and were all coagulase-positive. Culture filtrates of the cheese strain produced severe abdominal pain and diarrhoea in a human volunteer, whereas a similar amount of filtrate, after boiling, had no ill-effects.

The three strains of staphylococci were phage-typed and all found to belong to the same phage group. This result was useful in that the absence of clinical signs in the goat which was excreting *Staph. aureus* made it doubtful whether the milk and cheese strains were identical.—H. E. BYWATER.

GORDON, R. F., & BUXTON, A. (1945.) A case of food poisoning in man probably caused by the consumption of a duck egg.—*Mon. Bull. Min. Hlth emerg. publ. Hlth Lab. Serv.* 4. 46-50. Reprinted in *Vet. J.* 101. 131-135. (1945.) 2178

Salmonella typhi-murium was isolated from the blood and faeces of a man who had eaten a fried duck egg and who died after having acute gastro-enteritis.

The egg was obtained from a neighbour who kept four ducks and a drake in most insanitary conditions. Eggs from these ducks had been eaten regularly by the family and neighbours without ill-effects during previous months.

Agglutinins to *S. typhi-murium* were demonstrated in blood samples from three of the four ducks. The four ducks and the drake were purchased and brought to the Ministry of Agriculture and Fisheries Veterinary Laboratory at Weybridge for further observation. Four further tests were carried out and these showed considerable fluctuation in the serum titre to both O and H suspensions. This variation in the agglutinin content of duck's sera has been recognized by GORDON *et al.* [V.B. 14. 296] who associated it with ovarian activity. At Weybridge the ducks' egg production rapidly decreased and only 16 eggs were laid, three of which

yielded *S. typhi-murium*. The birds which laid the infected eggs were tested prior to laying and two gave completely negative results the day before the infected eggs were laid, while the third duck gave a negative agglutination seven days before laying the infected egg.

Two of the four ducks died and the remaining two were killed for examination. Cultures were made from the liver, heart, spleen and gall bladder. The ovaries and the intestinal tracts were ground up and cultures were prepared from them. *S. typhi-murium* was isolated from the ovaries of two of the ducks and the intestinal tract of another.

These tests support the contention of GORDON *et al.* [*loc. cit.*] that routine testing of ducks is of doubtful value since a negative result may be obtained from a duck in which the organism can be demonstrated in the tissues.—H. E. BYWATER.

RICHTER, C. P., & EMLEN, J. T., Jr. (1946.) Instructions for using ANTU as a poison for the common Norway rat.—*Publ. Hlth Rep., Wash.* 61. 602-607. 2179

This paper is intended for public health workers engaged in large-scale rat control. No special merits are claimed for this poison, α -naphthyl thiourea (ANTU), but it was used with safety over a period of three years in a city-wide experimental campaign and the rat population was reduced by about 90%.

Emphasis is laid upon the preparatory organization necessary: poisoning operations on a small scale are useless. ANTU is not a cumulative poison and after eating a sub-lethal dose tolerance is acquired lasting some 30 days; workers must therefore ensure that the rat's first meal is its last. ANTU can be distributed in many ways and several methods should be used at the same time. Spring, summer and early autumn seem to favour operations.—S. M. G.

I. CARMICHAEL, J. (1945.) Achievements of the Colonial Veterinary Services in East Africa during the war.—*Vet. Rec.* 57. 572-574. 2180

II. HENDERSON, W. W. (1945.) Achievements of the Colonial Veterinary Services in West Africa during the war.—*Ibid.* 574-578. Discussion pp. 578-580. 2181

I. C. reviews the work of the veterinary services in East Africa during the war. The area is about 15 times that of Great Britain and has a cattle population of 14 millions, with an equal number of sheep and goats. There is one veterinary officer to every 400,000 cattle. The influx of troops, the local recruitment of Africans into the forces, the arrival of thousands of Italian prisoners and of 20,000 Polish refugees, as well as demands for supplies for the fleet based on Mombasa, raised serious problems of supply of meat, dairy products, hides, etc., which had to be dealt with in addition to the routine control of disease. Trypanosomiasis and the very rapid spread of tsetse fly which occurred throughout East Africa in 1942-43 were dealt with. Italian prisoners were used in some parts to clear large areas of bush to produce barrier clearings. Tick dips were constructed along stock routes to prevent loss from East Coast fever. The supply of cattle for the civil and military populations was placed in charge of the veterinary department. Cattle were slaughtered at the main military centres in Kenya and their flesh canned at Liebig's factory, after being transported, mainly on the hoof, from Uganda and Tanganyika. Transit camps were built at intervals of 15-20 miles along the route, which had to be arranged to ensure water supplies and to avoid tsetse belts.

Research work was hampered by war conditions but as a result of work on the aromatic diamidines and the phenanthridinium compounds a great step forward

was made in the treatment of trypanosome and babesia infections, especially in the treatment of *Trypanosoma congolense* infections.

Veterinary officers were also called upon to undertake work outside their professional sphere, as for example the establishment and running of a settlement for Polish refugees, the charge of an internment camp, etc.

Figures are given for the production and export of livestock products.

II. H. deals with the war-time activities of the veterinary services in West Africa. In the control of infectious diseases, mass immunization was the chief weapon used. In 1943, inoculations against rinderpest, blackleg, anthrax, contagious pleuro-pneumonia and haemorrhagic septicaemia exceeded two million. Goat-adapted rinderpest virus obtained from Kenya proved to be too virulent for use in Nigerian cattle but by further passages in Nigerian goats it was attenuated to such a degree that it could be used with safety. In the Gold Coast, however, goat virus was too virulent for use on the dwarf humpless cattle. These cattle were immunized by a first inoculation of formalized spleen vaccine followed some 7-14 days later by the simultaneous injection of bovine virus and immune serum in fairly large doses. The high susceptibility to rinderpest of the dwarf cattle is believed to be due to the fact that they are usually carriers of trypanosomes. A veterinary school was established at Vom for the training of Africans as assistant veterinary officers and as veterinary assistants. There are two courses one extending over five and a half years and the other over three years. Pasteurized milk was successfully transported over a distance of 700 miles in specially constructed insulated boxes but this had to be abandoned on account of the heavy rail charges. The preparation of butter from milk produced by native herds was developed and output rose to 400,000 lb. a year which was sufficient to meet both civil and military requirements. A factory for the manufacture of cheese was started and output rose to 150,000 lb. per annum. Military requirements demanded an increase in meat supplies which was met by the establishment of fattening stations. Cattle were purchased in the Northern Provinces and railed 700 miles to the centres where they were fed for 3-6 months with a gain in weight of at least 2 cwt. per head. A pork and bacon industry was also established. Large White pigs were imported to form a foundation stock. Preliminary results were so encouraging that the breeding of pigs was taken up by farmers. The bacon factory at Lagos was soon handling 400 carcasses a month. At Accra the military authorities developed a pig farm with 1,500 head of pigs.

A plea is made for a more unified veterinary service in the West African territories which, it is claimed, would simplify disease control measures and the preparation and supply of the biological products required for mass inoculation campaigns.—S. A. EVANS.

HOMAN, D. (1946.) International veterinary congresses.—*Vet. J.* 102. 12-20. 2182

H. traces the history of the International Veterinary Congresses from 1863, when the first was held in Hamburg. Parallel with the increase in the number of the participating nations, the number of delegates and the volume of business transacted increased and the scope of the questions discussed became wider.

H. describes the organization of the congress, which since 1909 has been in the hands of the Permanent Committee of the International Veterinary Congress working through a number of sub-committees organizing the social and scientific aspects. The congresses have attracted interest in government circles and many

governments now send official delegates and give financial assistance.

It is very necessary that the International Veterinary Congress should be reconstituted at an early date: H. suggests that the Permanent Committee of the International Veterinary Congress elected at the 13th meeting at Zurich in 1938 should fix the date and the location of the next congress. At this congress an "International Veterinary Union" should be set up with an "International Veterinary Office" as managing organ. Besides secretarial offices, the I.V.O. should have departments for the exchange of information on scientific matters, a social section and a propaganda department. The department for the exchange of information on scientific matters should take care of all questions concerning the general advancement of veterinary science and its practical application, and should organize the exchange of young veterinarians who wish to study in foreign countries. The social department could promote permanent social correspondence amongst veterinarians and the propaganda department could educate the public to a general interest in veterinary matters. The International Veterinary Congress would constitute a plenary session of the International Veterinary Union, which should work in close collaboration with the United Nations Organization.—T. E. GIBSON.

— (1946). *Dominion of New Zealand. Veterinary service.*—Extract from *N.Z. Dep. Indust. Comm. off. News Lett.* July 5th. 2183

A national veterinary service for New Zealand is to be established under legislation to be introduced during the coming session of Parliament. If the current proposals are put into effect a central council will be set up with the following representation—Government (2), Dominion Federation of Farmers' Veterinary Services (2), Dairy Board (2), Meat Producers' Board (1), Wool Board (1), Veterinary Association (1).

The function of the council will be to organize efficient veterinary services for all the livestock owners of the Dominion. It will have complete control of central funds to be provided by a levy on animal products subsidized by the Government, probably at the rate of £1 for £1.

The council will encourage the formation of more veterinary clubs, to which it may grant subsidies to ensure their stability. It will endeavour to ensure that sufficient veterinarians are trained, and to that end it

may grant bursaries to selected students. It will seek to promote the fullest possible collaboration between all interested organizations with a view to increasing the efficiency of animal husbandry, and it may appoint officers to arrange for extension work in animal health and production.

It is expected that the scheme will broadly follow the recommendations made in the majority report of the Veterinary Services Committee last year. That report suggested the following basis for the levies: 400 million lb. of butterfat at 0.02d. per lb., £33,333; 1,000,000 bales of wool at 1d. a bale, £4,667; 12,000,000 fat lambs at ½d. a head, £12,500—total £50,500. A £1 Government subsidy would raise the total to £101,000.

I. SAVAGE, W. (1945). *Water supply problems in rural districts.*—*J. R. sanit. Inst.* 65. 137-143. 2184.

II. ALLEN, A. J. (1945). *Water supply problems in rural districts from the engineering point of view.*—*Ibid.* 143-146. Discussion 146-149. 2185

I. The problem of an adequate water supply in rural areas is chiefly one of distribution on economical lines.

Agricultural demands are larger than is generally realized, e.g., the daily average need for cows in milk is 15 gal., for horses 10 gal., for pigs 3 gal., for sheep 1½ gal. Other general requirements on a farm may amount to a further 300 gal. per day. An average farm consumption might be about 1,000 gal. a day, apart from domestic usage; this is equivalent to the needs of approximately 40 people. Such a quantity cannot all be derived from piped supplies. Agriculture must distinguish between its needs for pure water and its needs for water of a lower bacteriological standard. Highly polluted pond water may prove a source of infection but water from streams of ordinary quality is safe for stock.

From the economical point of view, water for agricultural purposes must be supplied by meter to check wasteful consumption.

II. There appears little doubt that, in time, production of milk will only be allowed under T.T. or attested standards. All schemes for the water supply of rural districts will have to be considered with this in view. The seasonal differences in water consumption on the farm, e.g., peak consumption during July and August, are discussed. Special account must be taken of districts which are mostly sheep downland and of those with practically no streams or pools or with an abundance of open water.—H. E. BYWATER.

See also absts. 1928 (septic sore throat and bovine mastitis), 1938 (danger from TB. in goats), 1950 (salmonella types in Australia), 1953 (salmonella in hens' eggs), 2007 (milk-borne infectious hepatitis).

TECHNIQUE AND APPARATUS

*BLISS, C. I. (1944). A simplified calculation of the potency of penicillin and other drugs assayed biologically with a graded response.—*J. Amer. statist. Ass.* 39. 479-487. [Abst. in *Biol. Abstr.* Sect. F. 19. No. 4. 2, copied verbatim. Signed: I. W. BURR.] 2186

The technique presented is based upon the following requirements: 1) a graded response linear with respect to the logarithm of the dose of the drug; 2) arrangement of individual reactions in relatively homogeneous sets of 4, each set containing 2 different doses of both a standard and an unknown; 3) the same ratio between the doses of each preparation. Equations are derived for the relative potency of the unknown drug and for the corresponding standard error. Criteria for checking whether the method is applicable are given. 2 numerical examples show how easily the method is applied.

RAHN, O. (1945). *Physical methods of sterilization of microorganisms.*—*Bact. Rev.* 9. 1-47. 2187

This review article surveys the literature on the sterilization of micro-organisms by physical methods and includes so much material that it is only possible, in a short abstract, to indicate the general scope of the paper. R. deals with the mechanical causes of death of bacteria, including grinding and shaking, pressure and sonic waves and destruction by irradiation. In discussing "death by desiccation" he distinguishes between the death of organisms during desiccation and the killing of dry bacteria; he also deals with death caused by dry heat. The effect of low temperatures is reviewed under three headings, the effect of subminimal temperatures, cold shock, and freezing. Further sections include the effect of moist heat and the effect of surface tension depression on bacteria.—T. E. G. SPRICK, M. G., & TOWRY, J. W. (1946). *Isolation of*

Mycobacterium tuberculosis from gastric contents neutralized after varying periods.—*Publ. Hlth Rep., Wash.* 61, 648-651. [Authors' summary copied verbatim.] 2188

1. Thirty-three gastric specimens were studied as to the effect of neutralization immediately, after 24 hours, and after 48 hours.

2. Three times as many positive results were found when specimens were neutralized immediately as at 48 hours and nearly two times as many as after a 24-hour interval.

See also *absts.* 1935 (TB. diagnosis), 2019 (concentration of antitoxic sera), 2042 (formol-gel test), 1971 ("freeze-drying" of *Bact. coli*), 1978 (feeding mosquitoes through animal membranes), 2043 (removal of calculi from ureter), 2091 (electrophoresis).

MISCELLANEOUS

GRANGER, W. (1944.) Selection of breeding ewes. Dependence of practicable degree of selection of young ewes upon vital statistics.—*Aust. vet. J.* 20, 253-260. 2190

The extent to which selection of young breeding ewes may be practised depends upon the balance between the wastage in the breeding flock due to deaths and culling for age and the availability of replacements, in accordance with the number of seasons ewes are bred, the proportion of lambs produced and their survival until selection for breeding. This relation is expressed in the formula, $s = \frac{2,000,000}{nm(100 - d)}$, where s is the percentage of selection of young ewes that is practicable, n is the average number of seasons for which ewes are

*HAZELTINE, B. M., & EKEDAHL, V. (1945.) "Paul Bunyan" rake for removal of marginal vegetation in botulism control.—*J. Wildl. Mngmt.* 9, 193-195. [Abst. in *Biol. Abstr.* Sect. F. 19, No. 8, 6, slightly amended. Signed: T. I. STORER.] 2189

The authors describe the construction of a huge rake operated by a caterpillar tractor which was used on Bowdoin National Wildlife Refuge, Montana, to pull marginal vegetation on to the shore and reduce the incidence of botulism among waterfowl in small isolated bays.

bred and survive to rear their lambs, m is the proportion of lambs reared to marking time (castration, docking of the tail, ear-marking with the owner's mark) expressed as a percentage of the number of ewes present at the time, and d is the deficiency of ewe lambs (as marked) present at classing time, expressed as a percentage of $\frac{1}{2}m$. The terms in the formula can be obtained from flock records.

The use of the formula is demonstrated by comparing the effects of culling older breeding ewes at various ages and by showing the influence of the level of fertility upon the practicable degree of selection of young ewes when the numerical strength of the breeding flock is to be maintained at a given level.—H. MCL. GORDON.

REPORTS

UNION OF SOUTH AFRICA. (1943.) Annual report of the South African Wool Council for the period 1st Apr 1942, to 31st March 1943.—*Org. Wool Fmr. Pretoria*, pp. 1-27. 2191

The work of the Council is reviewed and the organization for research is outlined. In addition to work done at the Onderstepoort Veterinary Laboratories there is a new research laboratory at the Grootfontein School of Agriculture which deals mainly with nutritional and genetic problems. In England, wool problems are investigated at Leeds, at the London School of Hygiene and Tropical Medicine and at Cambridge.

The effects of climatic conditions on the Merino and its wool are the subject of an elaborate experiment in which a number of different sections at Onderstepoort are collaborating. The changes which occur with age in the Merino sheep are the subject of an experiment which is now in its eighth year.

A flock of 280 Merinos is being used in a study of the effects of breeding policy on development and production. An attempt is being made to establish, by selection and breeding, a type of Merino resistant to blowfly attack. The sex physiology of ewes of various breeds on the veld and under controlled conditions is being studied, as is the reproductive capacity of rams.

—M. C.

AUSTRALIA. (1944.) Seventeenth annual report of the Council for Scientific and Industrial Research, for the year ended 30th June, 1943. pp. 76. Items of veterinary interest pp. 17-18, 20-26, & 62. Canberra: Govt. Printer. fcp. 3s. 4d. 2192

The first epidemiological study of MASTITIS in dairy cattle was completed and a second one begun by subjecting calves from a herd free from the mastitis streptococcus to three different environmental conditions. On BRUCELLOSIS special studies were begun of the requirements for growth and longevity of suspensions to be used in strain 19 vaccine. Some results of work on ENTEROTOXAEMIA of sheep and other diseases due to clostridia have already been published [see V. B.

16, 41]. A study of the haemolysins of the *Clostridium welchii* group led to a great extension of the knowledge of the delta haemolysin of Type C, the causal organism of "STRUCK", a disease which has not yet appeared in Australia, and to the development of a haemolytic reaction on blood agar which is likely to be a valuable test for the organism. BOVINE PLEURO-PNEUMONIA vaccine kept for 56 days at 4°C. protected cattle as well as freshly prepared vaccine. Calves do not respond well to vaccine.

Work on sheep blowfly was curtailed owing to the transfer of staff to problems of medical entomology. The B.T.B. fly dressing [see V. B. 12, 613] was given greater contact toxicity by replacing the tar oil fraction with a mixture of orthodichlorobenzene, lysol and kerosene. Further field trials were carried out on the value of the Mules' operation and the longer tail in preventing crutch strike. In one trial there were no strikes in sheep so treated, while 25% of untreated controls with short tails were struck. The Mules' operation and the longer tail do not remove the necessity for at least one mid-season crutching. There appears to be an increase in the proportion of epithelial debris to clean dry wool in samples from the crutch region of sheep susceptible to fly strike. The ratio of nitrogen to clean dry wool was 32 in wool from susceptible as against 18 for the more resistant sheep.

Following the rapid spread of the buffalo fly (*Lyperosia exigua*) to the east coast of Queensland as far south as Townsville, special investigations on control were begun. Work on the biology of the cattle tick (*Boophilus*) was continued and studies on dips were begun. Larvae in the parasitic stage were killed with arsenic more readily than those in the non-parasitic stage. There is evidence of the presence of arsenic-resistant ticks in parts of Queensland. Dipping sheep infested with itch mite (*Psorergates ovis*) in a lime-sulphur dip containing 1% polysulphide sulphur was highly efficient. In one trial 10,000 sheep were dipped, and periodical examination of skin scrapings from these

sheep showed that the mite had been eradicated. Epidemiological studies of the internal parasites of sheep in the field have been extended to cover extensive regions in the sheep-raising areas of Queensland. A single dose of 40 g. phenothiazine, which is twice the dose usually prescribed, removed all the *Oesophagostomum columbianum* from 14 sheep. A single dose of 20 g. removed all of these worms from 11 out of 14 sheep, and a second dose removed all the remaining worms. In a plan for eradication it is important to remove all of the worms. Storage of suspensions of phenothiazine for eight months did not impair anthelmintic efficiency. Stored suspensions did not produce toxic effects in the sheep treated. Tablets containing copper sulphate and sodium arsenite were ineffective against *Haemonchus contortus* in sheep. Arsenic pentoxide, sodium arsenite and copper aceto-arsenite (Paris green) were all effective. Oil of turpentine, administered in a salt-lick, had no effect on *H. contortus*. Studies on the treatment of haemonchosis under "out-break conditions" in the field showed that phenothiazine was the only anthelmintic which is highly effective. Movement of sheep after treatment to a pasture which has not been grazed for three weeks or more has definite value in delaying reinfestation.

Results from field trials on the use of MYXOMA virus to control rabbits were variable. The presence of predatory animals, especially the fox, favours the early removal of sick rabbits and with them all sources of infection. A period of fasting or of low food intake for about three weeks caused the lesions of PIZZLE ROT (BALANITIS) to heal in the majority of sheep affected. Sheep on cereal diets have a tendency to form URINARY CALCULI. A high magnesium content of the urine appears to be a contributory cause. A sudden and severe check in food supply in a flock of 500 ewes about to lamb and in good condition caused about 90 cases of PREGNANCY TOXAEMIA. Affected ewes, with two or three exceptions, carried either twins or triplets. Data from pathological and biochemical examinations are not yet available. Analyses of *Portulacca* and *Oxalis* sp. gave total oxalate contents of 8.5-15.5%. An outbreak of clinical HYPOCALCAEMIA in ewes was associated with consumption of these plants. Lambs weaned on to a mixture of 44 parts chaffed wheat straw, 25 parts oats, 25 parts bran, 5 parts linseed meal and 1 part sodium chloride all died within 3-6 months. Adult sheep and lambs which had been weaned for some time became severely hypocalcaemic on this ration. Serum magnesium and inorganic phosphate were considerably increased. Development of the teeth was grossly abnormal in all young sheep on the ration and appetite was seriously affected within 2-3 months. The addition to the ration of 1% finely ground limestone prevented all of these abnormalities and permitted normal growth and development, but had no curative effects when given after the abnormalities had developed. Slaked lime was not a satisfactory substitute.

In preliminary studies to determine the nature of the toxic effects sometimes seen in sheep which have consumed large amounts of wheat, marked changes were found in the flora of the rumen and the rest of the alimentary tract. Attention was given mainly to the possible role of histamine arising from decarboxylation of histidine.

Although a marked beneficial response is seen when sheep are grazed on copper-dressed improved pastures, additional copper supplements are essential to produce optimal health and wool production. Although copper is stored by the sheep in very considerable quantities under some conditions, studies in copper-deficient regions show that large doses administered once

in five weeks are not as effective as correspondingly small doses given three times weekly. The difference shows most clearly in the nature of the wool. Merino sheep are more tolerant than Border Leicester sheep of excess copper intake. Prevention of "steely" wool by regular administration of copper resulted in increased returns of up to 3s. per head. Cobalt is not stored to any extent by sheep. Animals given cobalt three times weekly did better than those dosed once in five weeks with a correspondingly larger dose. The use of copper and zinc manurial dressings on copper- and cobalt-deficient soils enabled the establishment of excellent stands of lucerne and "improved pastures".

Investigations concerning the efficiency with which the sheep utilizes the available energy in its fodder have been completed. A monograph is in preparation. The generally accepted assumption that digested starch and digested cellulose provide equivalent amounts of energy for ruminants, which was founded on Kellner's classical determinations, and which is the basis of correct feeding standards, will need to be abandoned in the light of the unequivocal findings of the investigations on energetics. New standards are being prepared. A large proportion of the energy which is assimilated by the sheep from some fodders cannot be utilized by the normal metabolic processes.

It was found that the vitamin A concentration of the blood remains constant until the liver stores are depleted, at which stage it falls abruptly and deficiency symptoms of NIGHT BLINDNESS appear. Terminal symptoms of PARALYSIS due to demyelination of the spinal cord supervened after 12 months on the deficient rations. Preliminary surveys indicate that VITAMIN A DEFICIENCY is not likely to occur in flocks until they have been exposed to dry grazing conditions continuously for approximately one year. The possibilities in the utilization of inorganic nitrogen, in the form of synthetic nitrogenous materials such as urea, in drought feeding are being studied. Observations on the mechanics of hand-feeding of sheep showed that a group of sheep given its weekly ration on one day utilized the feed almost as efficiently as a group fed daily. The weekly-fed group consumed the week's ration in 2½-3 days.

Observations were made on methods of conducting progeny tests with Merino rams under range conditions. During the year, 230 progeny of 22 sires were evaluated on two occasions at the ages of seven and 18 months, respectively. Characters evaluated were body weight, raw fleece weight, yield percentage, clean-scoured fleece weight, staple length, approximate fibre uniformity grade and skin fold development.

A comprehensive report on zebu hybridization has been published separately [see *V. B.* 16, 90].

Some 200,000 observations during five years show that all ewes, including Merinos, have annual seasons of high and low sexual activity. In the late spring and early summer months sexual activity is lowest in the majority of diversified breeds and strains of sheep in widely different environments and commonly results in a non-breeding season; individual behaviour, however, is hereditarily characteristic of some ewes, and from these early, mid-season, or late breeding varieties may probably be selected. Observations were made on the periodicity of oestrus in groups of ewes which received green feed for a period of three months at four different quarters of the year and dry feed for the remaining nine months. This procedure affected the percentage incidence of oestrus especially in young ewes, but the period of maximal activity was not altered.

In studies on the inheritance of pigmented wool it was found that pigmentation is a recessive condition and

apparently depends upon one of a pair of genes. Pattern and intensity are probably polygenic. Biological analyses of the fleeces were made from groups of Merino ewes. Observations included rate of production of dry wool per unit area of skin, rate of growth in fibre and staple length, rate of crimp formation, rate of production of wax and suint, variation in fibre thickness, fibre and follicle population density, variation in skin wrinkles and variation in body weight and daily food intake. Observations on fleece density were made on a large number of sheep from the important Merino strains in Australia.

The work of the section on biometrics included extensive study of data derived from the parasitological field trials at the field laboratory at Armidale, New South Wales, particularly of the reduction of primary climatological data in order to correlate them with variations in worm burden of sheep. Analyses of data from progeny testing of sheep were also made.

Investigations of which brief mention is made include "PEG-LEG" DISEASE of cattle, banding of pigmented wool, inheritance of skin wrinkles in sheep, inheritance of horns in sheep, establishment of an inbred flock of Australian Merinos, faults of Merinos, wool fibre measurements, amino acid constitution of plant proteins, deglutition in sheep and passage of copper through the intestinal tract [WATSON—*V.B.* 16, 365.] oxidizing enzymes and COPPER and COBALT DEFICIENCY, MINOR ELEMENT DEFICIENCY and "WEANER TROUBLE." Other investigations of some veterinary interest are those on canning bacteriology, with special reference to sporulating organisms, and on tinned butter, hardened butter substitutes, dry butterfat, compressed milk powder, etc.

Agrostological studies included grazing trials with sheep on natural and "improved" pastures, with relation to rotational and deferred grazing.

Drug plant investigations included studies on hyoscyne and atropine from *Duboisia* spp., opium alkaloids, ephedrine, quinine, emetine, santonin and pyrethrum.

The report contains lists of staff and personnel of committees and details of the financial aspects of the work of the Council.—H. McL. GORDON.

I. SOUTH AUSTRALIA. (1944.) Sixth annual report of the Council of the Institute of Medical and Veterinary Science, July 1943-June 1944. pp. 12. Adelaide: The Institute. 4to. 2193

II. SOUTH AUSTRALIA. (1945.) Seventh annual report of the council of the Institute of Medical and Veterinary Science, July 1944-June 1945. pp. 13. Adelaide: The Institute. 4to. 2194

The reports include sections on staff, routine work, research work and finance and a list of publications coming wholly or partly from the Institute.

I. The research work included studies on anti-bacterial substances produced by moulds, identification of salmonella occurring in Australia [*V.B.* 16, 340, abstr. 1950], CONGENITAL ABNORMALITIES in infants as a result of infectious diseases during pregnancy, INFLUENZA and non-specific URETHRITIS. Further work was done on *Corynebacterium equi* infections in pigs and on DEMYELINATION and ENCEPHALITIS, thiamine metabolism, PHALARIS "STAGGERS" and COBALT DEFICIENCY in sheep.

II. Most of the research work reported is a continuation of work described in the preceding report. Studies were begun on the metabolism of a cystinuric woman and the effect of ingested salicylates on body stores of thiamine. Work was resumed on leucæmia and tissue injury occurring in PNEUMONIA. A survey of the efficiency of various methods of the treatment of BREAST CANCER was carried out.—D. C. BLOOD.

I. U.S.A. (1943.) New York. Report of the New York State Veterinary College at Cornell University for the year 1941-1942. [HAGAN, W. A.] pp. 176. Geneva, N.Y.: W. F. Humphrey Press Inc. 2195

II. U.S.A. (1944.) New York. Report of the New York State Veterinary College at Cornell University for the year 1942-1943. [HAGAN, W. A.] pp. 178. Geneva, N.Y. 8vo. 2196

I. Details are given of the staff of the College and of the number of students. A short account is included of the research projects in progress, including work on BOVINE MASTITIS, the tuberculin test, BRUCELLOSIS, COCCIDIOSIS OF CATTLE, AVIAN COCCIDIOSIS, stomach worms of sheep, KETOSIS of cattle and the carbohydrate utilization of diabetic dogs.

II. Details of the staff of the College and of the number of students are given. Three full semesters of instruction were offered each year, by which procedure it was hoped to graduate 50% more students over a given period. All students were enrolled in the Army and assigned to the College, to prevent interruption of their studies. Research work undertaken included studies on BOVINE MASTITIS, JOHNE'S DISEASE, BRUCELLOSIS, AVIAN COCCIDIOSIS, an undiagnosed disease resembling BOVINE MALIGNANT CATARRH, *Dicrocoelium dendriticum*, SHEEP SCAB, POULTRY TUMOURS and the blood of fowls with "PULLET DISEASE."

In both I and II, tables are given of the cases treated in the clinics of the College and of the examinations carried out in the diagnostic laboratory. The work of the poultry laboratories at Ithaca and Farmingdale is summarized in tabular form. The final section of the report consists, as usual, of reprints of papers published by the staff. These are dealt with in *Index Veterinarius* and, when necessary, in the *Veterinary Bulletin*.

—T. E. GIBSON.

ALGERIA. (1945.) Rapport sur le fonctionnement de l'Institut Pasteur d'Algérie en 1944. [Annual report of the Pasteur Institute, Algiers, for 1944.] [SERGENT, Ed.]—*Arch. Inst. Pasteur Algér.* 23. 128-167. 2197

The work of the Institute is described.

SALMONELLOSIS in pigs was seen in an epizootic form. SWINE FEVER was unusually severe and an intra-dermal reaction [details not given] is stated to have been of service in diagnosis; 778,405 ml. of serum and 14,690 doses of virus were prepared and issued. Severe cases of THEILERIASIS in cattle occurred associated with outbreaks of FOOT AND MOUTH DISEASE. In an outbreak of "GHEDDA" in camels a salmonella was isolated from the blood and bone marrow, 123,940 ml. of antirabic vaccine for the prophylactic inoculation of dogs were prepared. Since 1929, 50,070 dogs have been vaccinated or revaccinated. In the first three years there were three failures, but during the past five years, out of 18,200 dogs vaccinated no failures have been reported.

—M. C.

BELGIAN CONGO. (1940.) Les élevages au Congo Belge en 1938. (D'après les rapports provinciaux.) [Livestock industry in the Belgian Congo, 1938.]—*Bull. agric. Congo belge.* 31. 58-74. [Dutch summary.] 2198

An account is given of the progress during 1938 of the livestock industry in each province, the activities of native and European breeders being dealt with separately. The numbers of livestock of various types and the current prices are given. In the province of Leopoldville there are some very large herds, e.g., that of the mission at Kisonitu with 9,700 head. Crossing of native cattle with sires of European breeds is dis-

couraged, as, unless great care is exercised, such practice leads to loss of vigour and resistance to indigenous diseases. A résumé is given of the more important diseases which occurred during the year. 103 cases of TB. in pigs and 11 in cattle were detected in slaughter houses in Leopoldville. CYSTICERCOSIS is common in cattle, in some areas the incidence being 70%. OSTEO-POROSIS [osteitis fibrosa] in horses and RICKETS in pigs occur in some areas. TRYPANOSOMIASIS is the most important disease and is dealt with by systematic micro-

scopic examination of blood films and treatment with tartar emetic injections. Results are said to be good, especially in cases due to *Trypanosoma vivax* infection. ANTHRAX and CONTAGIOUS ABORTION are common and are dealt with by vaccination.

The Government Veterinary Service consists of 13 veterinary surgeons and 8 assistant veterinary surgeons, along with about 60 African trained stock inspectors. In addition there are 14 veterinary surgeons and 30 European assistants in private employment.—M. C.

BOOK REVIEWS

WAKSMAN, S. A. [Professor of Microbiology, Rutgers University; Microbiologist, New Jersey Agricultural Experiment Station.] (1945.) *Microbial antagonisms and antibiotic substances*. pp. ix+350. 34 figs., 48 tables. New York: The Commonwealth Fund. 8vo. 21s. 6d. 2199

In this excellent survey, Professor WAKSMAN examines the antagonistic inter-relationships of micro-organisms and reviews the work which has been carried out from the time of Pasteur to the isolation of penicillin, tyrothricin and streptomycin.

The opening chapters are concerned with the natural habitats of micro-organisms such as soils, water basins, manures and faecal residues. The part played by organisms in the soil and in composting are obviously important but the sterilizing action of soil and manure on pathogenic micro-organisms and other parasites has been emphasized during recent years and has led to the isolation of antibiotics from soil, bacteria and fungi. In mixed populations, growth is more complicated than in pure cultures and symbiosis may occur in addition to the competition for nutrients in the environment. Various stages of symbiosis can be represented by a series from obligate parasitism, through facultative parasitism, modified parasitism, balanced parasitism and true symbiosis to true saprophytism. Similarly, bacterial antagonisms vary in intensity, and there may be antagonisms between bacteria and higher organisms. In some cases the antagonism may be due to production of a specific substance; the first substance of this type to be recognized was pyocyanase.

The methods of isolation and cultivation and of assaying antibiotic action are described and the antagonistic actions of bacteria, actinomycetes, fungi, viruses and microscopic animal forms are each discussed separately. The chemical properties and biological actions of a large number of antibiotics are described. The antibiotics are classified and their actions compared with the action of disinfectants, but as yet comparatively little is known of the mode of action of antibiotic substances. The practical use of bacteriostatic agents is limited by their toxicity and in this, penicillin and streptomycin are outstanding in their low toxicity. Bacterial antagonisms may be of value in the control of soil-borne plant diseases, where inoculation of the soil with suitable organisms may restrict pathogenic or harmful organisms and increase crops. The author considers that work on the physiology of microbial cells and on the action of antibiotic substances should grow side by side. This book is perhaps the most complete account of work in a subject which has developed rapidly only within the last few years and has a bibliography of over a thousand references.—E. BOYLAND.

DAVISON, F. R. (B.A., M.Sc., Ph.D., M.B. Formerly Assistant Professor of Pharmacology in the School of Medicine, University of Arkansas, Little Rock. Medical Department, the Upjohn Co., Kalamazoo, Mich.) (1944.) *Synopsis of materia medica, toxicology, and pharmacology*. For students and prac-

titioners of medicine. pp. 759. 40 figs. St. Louis: C. V. Mosby Company. 3rd Edit. 8vo. 32s. 6d. 2200

In the first edition of his book in 1941 the author set out to present concisely and thoroughly the information on drugs essential for the medical student and the practising physician. The drugs in the scheme included those of long standing and proved efficacy, as well as a number of the more important modern ones; those which had long since disappeared from the formularies or had been superseded and some of the more recent drugs whose efficacy had yet to be more generally accepted were not included. In short, his idea of the suitability of a textbook on materia medica was to strike a practical balance between the old and proven, and the recent and promising. The second edition followed the same plan, with, however, important additions and deletions in practically every section, and in this, the third edition, the author still tries to maintain his original objective. Since 1941 so much new information has been added to our knowledge of the sulphonamides, the vitamins of the B complex, vitamin K, the hormones, disinfectants and the microbiotic agents, that the entire text has had to be further revised. Moreover the chapter on toxicology has been considerably expanded to include the material believed to be essential for medical practice: it might well be called applied toxicology and is a model of lucid, concise and logical exposition of the subject matter from this particular angle.

The book is divided into two parts. The first deals with the basic principles of pharmacology, materia medica, prescription writing and toxicology; the second with the classification of drugs and the study of the individual classes of drugs. Four chapters are devoted to the "biologicals"—vitamins, sera and vaccines, hormones, and miscellaneous groups including the microbiotic agents. Finally, there is a chapter on the sulphonamides. Throughout the book are given numerous prescriptions of established efficacy commendably written in both the metric and the apothecary's system. A list of references is appended at the end of each chapter, the whole book being well indexed with bold-face numbers indicating extensive discussions, and written in an easy, readable style. The tree of pharmacology and materia medica contains much old and dead wood, as well as an overluxuriant growth of the new, and Dr. DAVISON's timely pruning should lead to a more healthy and fruitful growth.—A. EDEN.

— (1944.) *Outline of the amino acids and proteins*. [Edited by SAHYUN, M. (M.A., Ph.D., Vice-President and Director of Research, Frederick Stearns and Company, Detroit, Michigan).] pp. 251. Numerous figs., charts. Numerous refs. New York: Reinhold Publishing Corporation. 8vo. \$4.00. 2201

This excellent symposium on aspects of protein chemistry contains 12 chapters written by experts in the field. The whole is much more readable than is usual with works of this type and the editor and his contributors are to be congratulated. Each chapter contains a portrait of a scientist who has made some con-

tribution to our knowledge of proteins or amino acids. In general, these portraits have no relation to the subject of the chapters, but they form an interesting collection of portraits of scientific worthies.

The opening chapter deals with the discovery of amino acids, from cystine, isolated in 1810, to threonine, discovered in 1930. Other chapters describe the occurrence and properties of proteins and their constituent amino acids, protein structure, hydrolysis of proteins, synthesis, isolation and analysis of amino acids, the role of amino acids in immunity, the part played by amino acids in detoxication processes, the metabolism of proteins and amino acids, the intermediary metabolism of different amino acids (including the inborn errors of amino acid metabolism), the biological value of protein and its relation to nitrogen balance, and finally, the part played by amino acids and proteins in nutrition.

Work on protein chemistry has reached an interesting stage, now that all the major constituents are known, and a beginning has been made on the determination of detailed structure of the proteins themselves. The recent work on proteins using labelled nitrogen (N^{15}) and hydrogen (deuterium H^2) has shown that most of the body proteins are able to take up and incorporate dietary nitrogen. The serum proteins and proteins of internal organs take up the dietary amino acids most rapidly but some are incorporated in proteins of skin and muscle. Thus work with labelled elements has shown that the body proteins must be in dynamic equilibrium and continually changing, so that they can take fresh amino acids into their molecules.

The book contains a curious appendix of a list of patents (U.S.) on amino acids. Some of these relate to sodium glutamate which is used extensively as a condiment, others to intermediates for nylon manufacture and some to pantothenic acid synthesis.

The work can be recommended to students of biochemistry and is remarkable in the thoroughness with which the subject is discussed in a small book.—E. B.

BRODY, S. [Ph.D.] (1945.) Bioenergetics and growth. With special reference to the efficiency complex in domestic animals. pp. xii+1023. Numerous figs. & tables. New York: Reinhold Publishing Corporation. 8vo. \$8.50. 2202

As converters of farm foods into saleable products or muscular work, the domesticated animals are an integral part of most systems of agriculture. This book is an able account of the accomplishments of a research programme commenced over 20 years ago by the Missouri Agricultural Experiment Station and specifically designed to study problems related to these conversion processes. Much of the data has already been published by Dr. BRODY and his co-workers, and the importance of this book lies not so much in its detailed information on many aspects of growth, metabolism and efficiency as in the broad generalizations which have been determined from large quantities of experimental data. The treatment of these data is statistical but the equations used to represent body processes are rational rather than empirical. This marks a considerable advance in a highly complex field, and, although it is permissible to criticize some cases of over-simplification, the fundamental pattern of growth, ageing, metabolism and efficiency, is perhaps best expressed in those simple exponential and power functions which allow a simple explanation in terms of autocatalysis, thermodynamics and allometry. It is for this reason that the "integrating" chapters of Dr. BRODY's book are of such interest, for here he discusses the many complexities of processes in relation to single simple biological principles.

It is impossible in a short review to deal with the immense amount of data which is presented in the numerous tables and graphs throughout the text. The analysis of the time relationships of the growth of populations, individuals and particular organs, ageing in relation to growth, energy and N metabolism in maturity and during growth are but a few of the subjects discussed, while a considerable part of the book deals with the efficiency of particular processes of economic importance, both from the point of view of energy transformations and from that of monetary profit.

—K. L. BLAXTER.

KAUFFMANN, F. (1941.) Die Bakteriologie der Salmonella-Gruppe (Typhus - Paratyphus - Enteritis - Gruppe). [Bacteriology of the salmonella group.] pp. 393. Copenhagen: Einar Munksgaard. 8vo. Dan. cr. 29.— 2203

A review copy of this important monograph has just been received. As an opportunity occurred in 1943 to see a single copy of this outstanding work, steps were at once taken to secure for this *Bulletin* a full and detailed abstract of its contents. Readers are now referred to *V. B. 13*, 156-159 for this information. Now that the original is available, workers on the salmonella group will no doubt wish to obtain their own copies.

CHANDLER, A. C. [M.S., Ph.D., Professor of Biology, Rice Institute, Houston, Texas.] (1944.) Introduction to parasitology. With special reference to the parasites of man. pp. x+716. 309 figs. Numerous refs. London: Chapman & Hall; New York: John Wiley Sons, Inc. 8vo. 7th Edit. \$5.00. 2204

This book has increased considerably in size since its original publication 26 years ago. The title has been changed several times to meet its increasing scope and the present edition, which appeared four years after publication of the sixth, is a revision of the book formerly published under the title "Introduction to Human Parasitology". It has again been completely re-written and brought thoroughly up to date, although there have been no very extensive changes in arrangement since the sixth edition, in which the scope was widened to include information on the principal parasites of domestic animals and lists of references were appended to each chapter. The three main sections deal with Protozoa, helminths and arthropods and short accounts of spirochaeta, rickettsial, and virus diseases are included in the section on Protozoa. Simple keys to important families, genera or species are given, particularly in the section on Arthropoda.

Although the main descriptions in this book relate to the parasites of man, enough information is given about parasites of animals to make it of use to veterinary as well as to medical students and practitioners. Emphasis is placed on the life-history, epidemiology and inter-relationships of parasite and host, and on the principles of treatment and prevention of infestation; systems of classification are not over-emphasized and, where inserted, are in smaller type and so arranged that they can be disregarded by any reader not especially interested in taxonomy and morphology. There are just over 300 black-and-white illustrations, which are reasonably good, but no coloured plates in the book; there is also an adequate index. The chapters on such subjects as the successful transmission of *Leishmania* infections by the bites of sandflies, the trypanocidal action of aromatic diamidines, and the insecticidal properties of D.D.T. and its effect on the spread of louse-borne typhus fever are excellent examples of the manner in which the book is up to date in subjects in which there have been recent developments.—J. N. OLDHAM.

CANADIAN JOURNAL OF RESEARCH

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INDEX VETERINARIUS

The publication of *Index Veterinarius* commenced with the indexing of the literature of 1933. It is a complete index of current publications relating to veterinary research, public health, administration, education and other aspects of veterinary science.

The latest list of the publications indexed for this purpose was included in *Index Veterinarius*, Vol. 6, No. 1 (issued December, 1938) and also circulated with the *Veterinary Bulletin*, Vol. 9, No. 1.

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